RAILROAD GAZETTE

FRIDAY, APRIL 15, 1898.

CONTENTS

Contributions.

Date of Meeting of the Conventions.

Chicago, April 7, 1898.

To the Editor of the Railroad Gazette:

The statement in your paper about the meeting of the M. C. B. and M. M. annual conventions at Saratoga is deceiving the members. You will observe Mr. Cloud says the meetings are the 15th and 20th of June. Your paper says the 8th and 13th of June.

SUPT. M. P.

[The mistake was corrected in our standing announcements after two insertions.—Editor.]

Torpedo Boats from the Lakes to the Ohio.

To the Editor of the Railroad Gazette:

Can you give the following information in the Gazette? Would it be possible to transport by rail from the Lake shipyards at Cleveland, Detroit, Bay City and Chicago, torpedo boats of the dimensions of the "Mackenzie" or of those of the "Cushing," say to the Ohio River at Cincinnati? The former boat is 100 ft. long, 12 ft. 9 in. wide, about 9 ft. deep (amidships, to the deck) and displaces complete 65 tons. The hull would weigh probably half that, but it is desired to know if such a craft, engined and finished, but not outfitted, could be transported as mentioned. The "Cushing" is 138 ft. long, 14 ft. beam, 9 ft. deep and displaces 105 tons. Are the curves, width of way, bridges, &c., of such character as to prevent this service even under emergency conditions, when alterations of obstructions or strengthening of points of the road would be well paid for by the Government? READER.

Cleveland, O., April 11, 1898.

There is no reason why boats of the size of the "Mackenzie" and "Cushing" could not be transported from the ship yards at Cleveland to Cincinnati, providing the dimensions and weights given are correct.

There will be no difficulty about the weight, as locomotives of heavier weight per foot have often been shipped on cars. As to the length, girders 120 ft. long, and possibly longer, have been transported successfully, and as to the width, care being taken in passing trains on side tracks, there is no substantial obstruction between Cleveland and Dayton on the Erie road that would interfere. The height can be easily managed, as the boats could be loaded on cars the floors of which would be as near the rail as possible. AUG. MORDECAI,
Assistant Chief Engineer.

Tests of M. C. B. Couplers.

American Steel Foundry Co.
St. Louis, April 11, 1898.

To the Editor of the Railroad Gazette:

We note the paper on tests of couplers published by you last week, and your editorial notes thereon. Our opinion, based on the experience we have had in the manufacture of automatic couplers, is that the only proper specification is as follows:

Couplers to be made of a given kind and grade of steel; minimum and maximum variance from same to be stated; each coupler to be stamped—showing which heat it belonged to and as to whether coupler complies with specifications—reference to be had to analysis of finished product from that heat. So much for the chemical specification.

Physical specification to be: Any one coupler from that heat (to be selected by inspector) to stand three blows at ten feet, and six blows at five feet. This last specification would determine the question as to whether the cores had shifted, making thin sections in certain vulnerable parts of the coupler.

For malleable iron, the only proper specification, if one desires to insure results, is to test every coupler; for, as is well known, in malleable castings as large as couplers one portion of the casting may be well annealed, while another portion may be almost, if not quite, as brittle as the hard iron was from which the casting is made. Consequently, casting a small test piece on one part of the casting, is not, in any manner, a reliable guarantee.

EDWARD F. GOLTRA.

The McConway & Torley Company.
Pittsburgh, Pa., April 5, 1898.

Referring to the article on drop tests of M. C. B. couplers, nothing better in the way of criticism suggests itself to me than to inclose copies of some matter which we have from time to time written to railroad officers on this same subject. We have never been believers in the system of smashing couplers under a drop as a means of determining their quality. It is expensive to the extent of the percentage of couplers smashed, and conveys no knowledge of any value.

WM. McCONWAY.

Extracts from Letters from the McConway & Torley Co.

"We have never seriously considered the adoption of the system of selling couplers under test on the lines indicated in this correspondence. When we began the manufacture of this type of coupler, now nearly 20 years ago, the drop was used, but it failed then to give any results which would be at all worthy of consideration; in other words, it was clumsy and unscientific. Within the last two years we erected a drop for the purpose of determining whether our original conclusions would be modified by another series of investigations in that line. We have since taken the drop apparatus down for the same reasons which influenced us in the first instance.

"The line of development which we have followed out in strengthening the Janney coupler is based entirely on the inspection of all Janney couplers which have ever been broken. We say all, because practically all broken Janney couplers have come back to us under our general replacement terms. We have the record of every coupler broken within the last ten years, and from time to time, as the tabulation of this record has shown a weak point in the coupler, that point has been strengthened. (We may say in passing that couplers never break in service at the points where they break under the drop.) The result of this system shows in our records as follows: Taking the guard arm breakage as the basis, the annual breakage of guard arms on couplers made prior to 1893 was 3.57%. After a general correction for weak points having gone into effect, we find that to date—that is, for the years 1894, 1895 and 1896, and nine months of 1897, nearly four years—the breakage has been reduced to 0.56%. Our records are based on 550,000 couplers in service, of which nearly 400,000 are of the later model.

"We have observed, in the course of our experiments, that a coupler of a light section stands better under the drop, because it yields and bulges. It is also within our personal experience that when couplers are made light they in course of time bulge or buckle in service. This of course, is objectionable. It is a thing which takes a long time to develop, but we need hardly discuss that here.

"We may also remark, in considering the guard arm test, that we have recently observed some couplers in service with the guard arm very materially shortened from the standard. This shortened guard arm furnishes a protection as against the opposing coupler, but in the instance which we have in mind the design and lock are of such character that lost motion in the knuckle comes very quickly in service, and we have handled some of them where the lost motion was so great that two having the same degree thereof would, on account of this shortness of the guard arm, come uncoupled without unlocking. Therefore, when a strong guard arm is presented, it should be considered very seriously whether the risks involved are not more than met by disadvantages in another direction.

"From Jan. 1, 1894, to Nov. 1, 1897, we have recorded 41,786 physical tests of our product; during the same period 10,547 tests by analysis, so that you will see that we are not indifferent to the character of our product, and that we have good grounds on which to rest our guarantees, which, by the way, have never yet become burdensome in the slightest degree."

"Let us suppose that we offered one hundred couplers for acceptance, and that the sample failed. This would condemn the lot. What would we do with the remaining ninety-nine? You reject them on the theory that they are defective; we must, under our agreement, acquiesce and admit that they are defective—for you. Under such circumstances but one of two courses would be open to us, viz.: to scrap the lot; or, put them off on some one with whom such an inspection arrangement did not exist. We say 'put them off' because no railroad officer would, with a knowledge of the facts, be willing—or ought to be willing—to accept as merchantable that which had been rejected by another. We are unwilling to put ourselves into that position in which we must risk material losses which can only be avoided by methods of business that would not bear investigation. The ethics by which we try to be governed would keep us always in such condition that we can say with absolute truth to any customer, at any time, that what we deliver to him averages as perfect as that sold to any other customer.

"It may be said that, in event of the failure of the sample coupler, the lot ought to be scrapped, and this would, on its face, be plausible, but let us test that theory by facts arising out of the necessary and unavoidable conditions.

"In our practice (and conditions following will apply for any malleable foundry), an output of one thousand couplers may include product from twenty or from forty heats, or any number between. All the stock in any one heat does not usually go into couplers. Couplers cannot be marked when moulded as for any particular heat; if an attempt was made to do so, no confidence could be placed in the result. The moulding and melting do not run concurrently; for safety the moulding must always be ahead, and a moulder never knows in advance exactly how much iron he will be able to carry from the furnace to his floor during the time a heat is running. Now, follow in your mind the product of twenty or forty heats from foundry to 'rolling' room, where they come in contact with and are mixed with the product of the day before; again into the trimming room, where they are again mixed; next the annealing furnace takes them—more mixing—with the last pieces into annealing house usually taking the lead into furnaces; back again into 'rolling' room, and so they roll and mix until through the fitting and inspection department, they would be ready to yield for the inspector one hundred fitted couplers, representing heats anywhere between, say, number one and number five hundred; and now we come to the question: What value—what practical value—as a definite indication of the quality of the other ninety-nine, will the testing of the one have? In case a very good one turns up, it cannot be said that all are as good, or if a bad one, that all are bad."

The Trojan Car Coupler Co.
Troy, N. Y., April 6, 1898.

I can find no criticism to make of the conclusions drawn by you. The pith of the whole question is summed up in these two sentences:

As couplers of good malleable iron have been found to give satisfactory service, and as the cost of malleable iron is considerably less than steel, a factor is introduced which almost prohibits the establishment of a single test so long as there is a demand for both malleable iron and steel couplers. While railroads use both materials so largely for couplers, it is doubtless best to have the test requirements for one differ from those of the other, so as to insure not only the best malleable iron, but, if a stronger coupler is desired, the test requirements will be such as to compel the maker of steel couplers to furnish as good material as possible.

There is no doubt that steel couplers will stand a considerably more severe test under a drop than will the malleable iron couplers, when both are made of good material. This was demonstrated in the M. C. B. coupler tests of 1894, which you will probably remember. In these tests, five steel couplers stood more blows of the striking, guard arm and jerk tests than any of the malleable iron, though the superiority of the steel over malleable iron was not very great. A. H. RENSHAW.

April 6, 1898.

I have been in the coupler business long enough to know that the only true test for couplers is the service test. You can drop two couplers out of a hundred, or one out of fifty, and they may be good, and twenty-five of the others may be bad. This drop test stimulates the manufacturers to make a much better coupler; it is good for that purpose; but the only true test is the service test. Some couplers will stand the drop test, but not the service test. Almost every coupler made will stand what is called the M. C. B. test.

In regard to malleable iron and steel, statistics show that good malleable iron will stand as well, if not better, than steel. This I can prove by statistics that have been kept on at least three different roads, and they were very complete.

The malleable iron couplers that we make, and that one or two other concerns make, will stand better than any open hearth cast steel coupler made; that is, the breakage in three or five years' service will be much less than it will be of a cast steel coupler.

Every coupler that we turn out we test in three different places, and we know that if the coupler will stand these three tests, it will stand any test it would be put to; it will stand the M. C. B. test without any trouble. If every coupler company would test their couplers the way we do, very few poor couplers would get out. MALLEABLE.

Ethics of Railroad Management.*

. . . It is the moral aspect of their position (railroad managers), the standard of honor involved in their official actions, the grave consideration for the essentials of right or wrong; in short, the ethical side of railroad management, which I desire to present as deserving the attention of yourselves and of all high-minded railroad officers. . . .

That the management and conduct of railroads constitutes a profession, as noble and far-reaching in its influence on the welfare of society, as responsible to the trusts which are in its charge, and as much open to temptations as any other profession, there

* An address before the Commercial Club of St. Louis, by Dr. William Taussig, former President of the Terminal R. R. Association of St. Louis, and President of the St. Louis Bridge Co.

can be no doubt. An aggregation of officers who, such as those in the United States, have the care of property amounting to $12,000,000,000 in value, constitutes an organization most powerful for good or evil not only in the manner in which they administer the trust confided to them by owners of properties, but in the moral example which, through their conduct, their individual rectitude and their honorable instincts, they set to their colleagues at large and to the army of their employees, the rank and file of the profession, at home.

Yet there are no recognized rules of social intercourse; and no code of moral rules or ethics by which, in the railroad profession, men and character are measured. . . . In the absence of these, each member sets up his own code with or without consulting his conscience. And very often the individual conscience of a railroad officer is a distinct and separate moral quality from his official conscience. Many an officer would, under no circumstances, consent to do in private life what his official conscience permits him to do in the discharge of his official duties.

It is not the purpose of this paper to suggest what rules such a code should prescribe. But it seems timely and appropriate to suggest some of the essential points which might become subjects of railroad ethics.

First of all, good standing in society and in the profession. What is meant by good standing in society is not difficult to arrive at. . . . But what is to be implied by good standing in the profession? In the conflicts between the personal and official conscience of railroad officers, many cases may arise in which a strict interpretation of some of the ten commandments would lead to sore perplexities. The perplexing circumstances under which these cases are liable to arise may be classified as follows:

1. Illegitimate methods in the obtaining of business, divergences from truth, tricky dealings, covert violations of law and of the plain dictates of honor. Most of these are defended on the grounds of struggle for existence, on the plea that war justifies all methods of attack or defense, and on the principle that, in the interest of the property which one has undertaken the care of, any course, whether right or wrong, that promises success, is justifiable.

2. The social and official intercourse between officers and the tactful treatment of employees.

3. The temptation to profit, directly or indirectly, openly or covertly, by transactions which, through numerous channels, fall in the way of officers of corporations, and which, whether detrimental to the corporation or not, are always held to be questionable.

4. The difficulties and perplexities presented by their relations to the law-makers of the country.

As a rule, it may be said of modern railroad officers and managers that they are men of the highest character, that they rank in brains, intellect and probity with the highest of other professions, and equal in industry, energy, ceaseless work, and loyalty to their employers, any class of public or private servants. They have been not inaptly compared with the army. . . .

But here the simile comes to a halt, and the ethical philosopher asks a question. The soldier gives up, under oath, his individuality, and neither civil nor moral law holds him responsible for actions done by command. But, since you have not given up your individuality when entering the service of your corporation, but have reserved the privilege of leaving it at any time, is it always right, honorable and conscientious to carry out the orders of your superiors, even though such orders involve transactions which do not comport with truth and honor? Suppose that you are ordered to doctor your accounts, . . . for purposes of stock inflation, so that your corporation comes out in your balance sheet with flying colors, while you know it to be a deception, would you consider it to be your official duty to do that which your personal conscience condemns?

Or suppose that you are ordered to make secret rates and to deny having made them . . . granting that you did this in the interest of your employer and not for your personal benefit . . . does that lessen the moral stain upon your character, your truthfulness and your good standing in the profession?

It may be said that this is only the abstract side of the question and that in practice it presents a different view. Perhaps so; though what is wrong in the abstract can never be right in the concrete. The defense of such practices is sought in the chaotic condition of the whole system of railroads, the uncontrolled paralleling of established lines, the hunger of weak lines and their eating the vitals of the strong ones, the irresponsible receiverships, and the reckless methods which have brought about that struggle for existence in which all means of warfare are justifiable and which cannot cease until the weak and rebellious are subjugated and the strong only survive. . . .

Nothing will answer the purpose but the individual declaration of the leaders and the rank and file of the profession, as to what is right and wrong, what conduct entitles an officer to the respect of his colleagues, to a recognition of his good standing, and finally to his eligibility for such organizations as have adopted codes of ethics and conduct in which a standard necessary to good standing is clearly defined. The remedy against the prevalence of chaos and the effacement of all conscience and moral character in the profession must come from the profession itself.

Probably no such prominent and visible departure from the honest dealing both between railroads themselves, and between them and the public, has caused such unsavory reputation as the rate wars, which in recent years have destroyed more railroad property and effaced more the stability of their revenue than any disastrous element of a physical or financial nature. The demoralization of rates seemed to have brought forth an army of buccaneers in the traffic departments. . . .

It would take too much of the time allotted to me, nor would it perhaps be proper in this place to describe the many devious ways, discriminations, rebates, drawbacks to favored shippers, ticket brokerage, underbilling of weights, falsifying of classification, that have been resorted to by unscrupulous, irresponsible, and sometimes dishonest, officers. These practices developed in the disastrous years of 1892-3, when business was dull and traffic light, and were initiated mainly by combinations of weak lines and lines in the hands of irresponsible receivers. When once fully developed, they dragged the older and stronger lines down to their level. In the chaos and whirlpool of disorganization, no line, with the best intention, could find a firm footing. In vain did many of the presidents and managers try to call a halt, in vain did they try to keep steady front against the invading masses of freight and passenger officers, high and low, whose scramble for traffic and tonnage, at rates less than cost, amounted almost to a loot of their own treasuries. In vain did they call meetings and bring about solemn agreements. The ink was hardly dry on the instruments before the pledges were broken. Nay, men voted for and signed agreements, knowing that they would not or could not keep them.

It would be unfair, however, to prefer the charge for these malpractices only against railroad officers. The large shippers are often the first tempters. By artfully, untruthfully and consciencelessly representing to the traffic officer that they can obtain lower rates from rival lines reaching the same points, they manage to incite jealousy, strife and finally ruinous competition. Railroad wars are their great opportunities for profit. It is with their connivance that all the tricks of rebates, drawbacks, underbilling of weights, shipments in transit, and the like are resorted to, and often they offer inducements of participation in the profits to the authorized agent. Most of the discriminations in favor of the large shippers and against the small ones have their source and origin in the temptations offered by these great concerns, and the odium attached to these transactions is no less on them than on the transportation companies.

With the details of this demoralization this paper does not propose to deal. It is the loss of character, the low moral tone, the tendency to tricky methods and the absence of all moral responsibility—in fact, the ethical aspect of the case which concerns us, and which only a recognized code of rules regulating the moral conduct and responsibilities of officers belonging to the railroad profession can remedy.

The social relations existing between railroad officers and the treatment of their employees are also an important factor in the ethics of the profession. There are few occupations where the courtesies, the considerations for rank and ability, the polite forms and the outward demeanor which constitute the social branch of ethics, are more generally observed than among railroad officers. Their conventional style of correspondence maintains the true diplomatic turn. . . . In their official intercourse it is essential for railroad officers to overcome the impulses of personality and of individual inclination. They learn this quality (always having in mind the abler class of men) while serving as employees in the lower grades and observing the system followed by their superiors. Indeed, the method of handling inferior employees schools the superior officer to that of handling his equals. While the method of dealing with a brother officer is largely a question of convention, that of dealing with employees is a matter of policy, of conscience and of reckoning with the different phases of human nature. In few relations of life has such a variety of character, of tempers, of great perfection coupled with great defects, of loyalty to the service while in it and indifference while away from it, of perplexities between considerations of strict discipline and of humane instincts, of tempering severity with mildness and of animating the employees with the spirit and intentions of the employer, to be met and dealt with as by the manager of a large railroad system. . . .

Such a consideration does not imply solely fair wages and fair treatment. These are only the quid pro quo for the service rendered, and few of the men are satisfied with these alone. The moral temper of the employee is quickened by the approving eye of his superior officer to a degree that is not often appreciated by the latter. Few managers conceive how sweet a few words of deserved praise sound in the ear of the employee and how potent such may be in promoting loyalty to the service. On the other hand, let the strong studiously abstain from abusing their strength when dealing with the weak, and especially when imposing penalties for infraction of rules. Rules there must be, but ironclad rules, carried out to the letter, are often the instruments of tyranny in the hands of yardmasters, bosses and foremen.

A favorite punishment for slight violation of rules is "suspension" of a more or less temporary character. Mild as this method seems, I have seen much mischief and bad effect result from it. What is the "suspended" man to do with his time? He is not literary and cannot read all the time, he is not a philosopher who placidly accepts his fate; he is only a plain human being with all the impulses of activity alive in him. Apart from the loss of wages, which he feels heavily, his time hangs heavily on him. So he walks the street, finally turns to the saloon, to cards, to socialistic meetings, and, when he returns to service he is not half as good a man as he was before he was "suspended." Retention at half wages, as exemplary punishment, would be mercy in such a case. It is in such instances where the ethical sense of the manager may healthfully interfere, by keeping himself in touch with all grades of the service. It is a great mistake if he shrouds himself within his dignity, and, from the Olympic heights of his office, forgets that he has to deal with mortals. On a large system he has, of course, to deal with his men at long range, but he can infuse his spirit of fairness, frankness and good will among his department officers, and thus reach his men indirectly.

There is a trite and much abused saying that corporations have no souls. If soul means personality, conscience, individuality, regard for your neighbor, for public rights and for all the duties that make these qualities potent, then assuredly, under the existing organization of railroad management, it is the personality of the president or manager that diffuses itself throughout the service. If that personality, besides its business qualifications, possess the human and humane traits which determine the morals of the service, it will permeate all branches and departments and constitute the soul of the corporate management. Without fail its ethical influence cannot but make itself felt on the department officers.

I come now to the third of the questions in this ethical inquiry.

It often becomes to the conscientious railroad officer a matter of doubtful propriety, though for the less conscientious officer it may cause no hesitancy, to solve the delicate questions arising when opportunities for personal profit occur in connection with corporate business. . . .

In past times, still within the recollection of the older members of the profession, it was not considered illegitimate for officers . . . to be interested personally in all sorts of undertakings, the profits from which came out of the corporation of which they were the guardians. Prominent among these were the fast freight lines. . . . The projectors of these incorporated lines bought some hundreds or thousands of freight cars, established a fast time schedule with higher charges for goods shipped by such a line, organized separate offices and bureaus, and in time became great factors in fixing rates, receiving carte blanche to that effect from the general freight agents of the roads over whose lines they operated. The compensation they received was based on the mileage (generally two cents per mile) which each car thus used ran upon the road. The original owners of these fast freight lines were mainly the officers of the roads; their corporations furnished and incurred the expense for the fast services, and paid the tribute of two cents per mile. It is true that the roads saved the expense of furnishing the cars and received the benefit of increased rates, but is is equally true that two cents per mile traveled on generally long distances, on cars whether lightly or heavily loaded, or empty, formed a fixed charge, the profits of which to the officers largely overbalanced the advantages to the corporations.

Professor Hadley, in his valuable book on "Railroad Transportation," in speaking of these old fast freight line systems, says: "But it was found that these lines afforded great opportunities for corruption. The directors of railroads would buy stock in the transportation company, and then give this company a contract which enriched it (and them) at the expense of stockholders whose interests were intrusted to their charge."

The present system is entirely different. Each road owns its cars and receives from or pays to other roads over whose lines they pass a mileage varying from one-half to one cent. Still, a vast amount of money, amounting, according to the last report of the Interstate Commerce Commission, to nearly nine millions, was paid in 1896 for the use of private (mostly industrial) freight cars. Whether railroad officers at present have any interest in these private car lines is, so far, only a matter of surmise.

Similarly, it was not considered improper for officers and managers of railroads to take stock in express companies with which they made traffic contracts, to become interested in bridge companies, in the various sleeping car companies, and in inventions and devices which were to be used and paid for by the roads. For the wagon delivery of goods to and from railroad stations, and for passenger omnibus services in large towns, corporations were organized by railroad officers, with themselves as principal stockholders, to whom they, in their capacity as offi-

cers, gave exclusive privileges for that service at highly remunerative rates.

Thus it will be seen how elastic, in recent times, the conscience of the average railroad officer has been, and how, unconscious almost of doing any wrong, he took advantage of his position, often to the disadvantage of the interest intrusted to him, to enrich himself. I am quite sure that none of these gross methods are tolerated, or even attempted, under modern railroad management. . . .

After all is said on this subject, there remain transactions and methods regarding the propriety of which even the most conscientious officer may sometimes be perplexed.

Before entering upon these, it may be in place to consider, in a general way, the financial methods which often obtain in modern railroad management in this country.

Leaving aside the roads east of the Alleghanies, some older stock dividend paying roads west of them, and a few others of high financial position, it may be said with truth that, on many of the roads constructed in the West between 1880 and 1890, very little has been paid by the projectors or promoters on capital account. That is, practically nothing has been paid on the stock. The method of building roads through the agency of construction companies, who, for the consideration of so many thousand dollars' worth of bonds and stocks per mile of finished road, enter into a contract with the directory to complete the new line, has been, and is more or less today, the accepted financial scheme. In regard to construction of branch lines, it is almost universal. Generally the issue of bonds is made large enough to furnish, after deducting discounts upon their sale, money sufficient to build the road. The stock is pure bonus, represents nothing, and its only value consists in vesting its owners with the direction and management of the affairs of the road. But the matter does not rest here. Sometimes the directors and officers, with the aid and under cover of some outside syndicate, constitute the construction company. In other words, in an indirect way they contract with themselves, and assume the risk of loss or chance of profit in the final outcome.

On their face and on strict principles of honesty, such acts are wrong and improper. If there is profit in the transaction, it belongs to the company; if there is risk of loss, the project should not be undertaken.

But here again the reverse side of the case must be considered. An existing road, fully equipped and doing a fair business, finds its traffic drawn away by a rival line from common points to great centres in a way that cannot be met otherwise than by building a new line. To do this requires money. In times of financial ease this may be readily obtained. But if, as is the case sometimes for years in succession, the money market is close and bonds cannot be sold, what is to be done? If the competitive line cannot be built, and built quickly, the rival line gets all the traffic, destroys the revenue of the suffering road, and threatens it with bankruptcy. The bankers representing the investing public are not willing to take the risk, the individual directors are. Having taken the risk of loss, they are clearly entitled to any ensuing profit.

But it is equally clear that the only honest method in such transactions is, first, to lay the matter before the shareholders, openly and above board, to represent to them the actual facts, the necessities of the case, the confidence of the directors in the eventual outcome, and to invite them to a participation, according to their holdings, in the venture. If then the shareholders decline, it is perfectly legitimate for the directors, like any other individual investors, to take their chances in the enterprise.

There are other avenues to individual profit by railroad officers, the legitimacy of which is doubtful. A new line in a new country is in course of construction, stations are to be established and towns to be located. Evidently the managers know of these locations in advance of the general public and may profit by that knowledge. . . . Clearly their duty in all such cases lies in the same direction as above mentioned. Whatever profit, from whatever source, can be made out of the enterprise belongs to the stockholders. They should be given a chance, if the general treasury cannot be availed of for purchasing town sites, or coal and timber lands necessary to develop the resources of the road, to participate pro rata, in such investments. . . .

It remains finally to mention the fourth and the most serious and perplexing problem which continually faces managers of railroads and brings their civic consciences in conflict with their official duties. This problem involves their relations with the law-making powers of the country. . . . The difficulties and perplexities arise not so much from the laws that are passed as from those that are threatened to be passed unless consideration be given for not passing them; and, further, from laws, privileges and concessions which are essential to the conduct of the company's business, but which cannot be obtained without paying a consideration to those who control votes. Consideration is a mild word, but bribery is the plain English of it.

It is a sad fact, but one to which we cannot close our eyes, that systematic corruption in State Legislatures and in municipal councils has become a factor in modern civic society which must be reckoned with, not only by the people but by every corporation.

The average political highwayman finds it easier to "hold up" a corporation than an individual. A corporation has "no soul," it may be kicked because it has no friends, it cannot afford to kick back because it may be blown out of existence, and it is, therefore, considered a good subject and fair game for "delivery and surrender" and for paying the imposed ransom. This method of law-giving, or law-threatening, or law-refusing, this system of venality and blackmailing, of assessing every franchise asked for according to its supposed value, and of refusing it or granting it according to whether this assessment be paid or not, has become a settled occupation among low politicians, a profession, as it were, and almost an established perquisite of the venal legislator or councilman. It pervades and diffuses itself into all classes of state, town and other officers, who, perfectly aware of what is going on at the source of lawful authority, do not hesitate to adopt the practice wherever the corporation encounters any branch of it. . . .

The first mandate for this tribute on railroads comes in the shape of an open and dictatorial demand, as though by right of vassalage, for free passes. Unfortunately railroads all over this country have yielded to this demand and to that degree surrendered themselves to the politicians. Only the individual manager knows of the extent of this evil. The public has no conception of the millions of dollars in value that are thus thrown away annually. Passes are demanded not only by the individual legislators and councilmen for themselves and over the lines of roads in their respective States, but for any and all of their relations and friends, and friends of friends, and over any and all of the roads in the country from Maine to Florida and from the Atlantic to the Pacific. Following their lead come the adjunct State and city officers, the railroad commissioners, the tax commissioners, the county officers, the sheriffs, down to the town constables. Woe to the manager who dares to refuse. The property whose interests are intrusted to him is quickly made to suffer for it. In consequence, pass giving and pass taking has become a recognized practice, blandly accepted as a matter of course by the taker, growlingly yielded to, with an inward curse, by the giver, and ingeniously named by the sugar-coated phrase "courtesy."

This, however, bad as it is, is only a small affair as compared to the combinations that are made, systematically and almost scientifically, to exact money tributes from all sorts of corporations, and especially from railroads, who desire necessary legislation to be enacted or vicious legislation to be prevented.

How is the railroad manager to deal with that class of political cutthroats, how can he reconcile his conscience with the official interests which he represents, and what remedy is there for this appalling evil?

Evidently there is but one course—decline all such requests, firmly refuse all compromises with evildoers and fight them to the bitter end. No other course will satisfy public opinion and rehabilitate railroads in the respect and confidence of the community.

In the discussions on this lamentable condition of things it has been frequently urged that corporations generally, and railroads particularly, have been the initiators; that they have begun purchasing legislation and thus whetted the low appetite of the wicked in power.

Be this as it may, whoever was first, the bribe-giver or the bribe-taker, both are to be condemned. We are dealing with the present and not with the past. The single manager who would want to initiate the reform will of course be brought to grief. A prominent officer of the Pennsylvania road west of the Alleghanies courageously undertook, several years ago, to stem the tide of corruption in the Legislature of a state through which a large portion of his road ran, and refused to give passes to members, except over the line in the state and valid only during the session, and he absolutely declined to give, or ask for passes over other lines, to any state, town or county officer. He was quickly made to suffer for it. The assessment of the property of his company was increased to an unheard of ratio, and vastly in excess of that of other railroads in the same state which were equal, if not superior, to his own in value of road and equipment. Thus the rebellious road was punished and the compliant ones were rewarded. All the other independent assessors in the counties, cities and towns followed suit, raising their local appraisements of his company's property, and the increase in the amount of taxes which it had to pay in the end exceeded by many thousands of dollars the value of any number of passes which might have been issued, or any amount of blackmail that might have been paid to prevent such predatory legislation.

Yet, with all this punishment the company persisted in this policy, and does so, I believe, to-day. In my judgment, this company's loss of money was the best investment it could have made. Its single action left, however, no appreciable mark, nor can it be a matter of great astonishment if the single manager who is threatened with legislation amounting almost to confiscation, or with annoyances and punitive measures which interfere with the safe and economic operation of his road, unless he pays tribute in passes or money, hesitates and asks himself the question whether he is called upon to set himself up as an apostle of honor, as a reformer of degenerated society, to the detriment or ruin of the owners of the property which he has undertaken to take care of. If the people, he may argue, choose to elect bandits, they cannot blame me for paying ransom to elude their clutches. Hence no single manager can accomplish much. But a united action of the principal roads in the country, setting down a code of rules regarding this iniquitous practice, forming a solemn and determined phalanx against all transgressors within and without their ranks, a compact against issuance of passes to city, state or county officers, except upon fixed rules publicly recognized, and against giving money compensation for any kind of political favors, would assuredly go far gradually to modify and finally to eradicate this evil.

I have thus endeavored to describe the many temptations to seemingly illegitimate practices, the many doubts as to right and wrong in given cases, the inducements to serve the employer at the expense of self-respect and good conscience, the many perplexities between the devil and the deep sea, which often face the active manager of railroads. The object of this paper is merely to point out that there is an ethical side to these questions which needs only to be recognized to become a guiding moral law. Once recognized and formulated into a code by a voluntary association of the best elements in the profession, it will require no statutes or legislative enactments to make it the measure of respect towards each other, to guide to a high standard of conduct, and to purify the whole atmosphere of railway management.

What is Semi-Steel.*

Astonishing claims are now being made for a new metal called "semi-steel," and in order to call forth a prompt correction, in case of error, I propose to make here the assertion that there is no such metal as semi-steel, and furthermore, that the material so called is not a new discovery.

The name semi-steel is a misnomer and an altogether misleading term. It is sometimes difficult to define the line of demarcation between steel and malleable iron, since one blends almost insensibly into the other, but chemical analysis of so-called semi-steel fails to show any close relationship between this metal and steel, while physical tests are also equally widely divergent.

The following table represents fairly well the extreme variations in composition of each of these three forms of iron, viz., pig iron, steel, and malleable iron:

Chemical elements.	Pig Iron. Per Cent.	Steel. Per Cent.	Malleable Iron. Per Cent.
Iron	90. to 95.	98.5 to 99.5	99.5 to 99.9
Carbon	2.5 to 4.	1.5 to 0.5	0.5 to 0.1
Silicon	0.2 to 3.5	Trace.	Trace.
Sulphur	0.01 to 0.5	Trace.	Trace.
Phosphorus ...	0.01 to 1.5	Trace.	Trace.
Manganese ...	0.1 to 2.	0.01 to 2.	Trace.

N. B.—Special steels may, of course, contain much more manganese, others may contain nickel, etc., and traces vary.

The following composition may be taken as a fair average analysis representative of a good, strong No. 2 foundry iron:

Graphitic carbon	3.81 per cent.
Combined carbon	0.19 per cent.
Silicon	2.00 per cent.
Phosphorus	0.416 per cent.
Sulphur	0.013 per cent.
Manganese	0.355 per cent.

When steel scrap is melted with pig iron in a cupola the effect is, of course, to increase the proportion of iron and decrease the other elements in direct ratio to the amount of steel added. Assuming that it is practicable to melt in a cupola 50 per cent. of steel with 50 per cent. of pig iron to make "semi-steel," a very simple calculation will show that the resultant metal still comes within the chemical classification of cast iron.

The diluting—if the expression may be permitted—of all of the elements, other than iron, has not been sufficient to bring the metal within, or even approximately near to the chemical classification of steel. Furthermore, lowering the proportion of silicon to one-half of the original content has the effect of causing nearly all of the carbon to remain chemically combined with the iron when quickly solidified, leaving a small proportion only of uncombined or graphitic carbon, this greatly increases the chilling property of the metal, and causes it to become white or mottled in light castings. In order to prevent this occurrence it is customary to add a certain percentage of silicon, usually in the form of high silicon pig iron, in the cupola; this prevents, in a measure, the overturn of carbon from graphite to combined carbon, and keeps the metal gray; but it still further widens the breach chemically and physically between steel and this metal improperly called semi-steel.

The simple fact is that the melting of steel with pig iron causes the steel to lose its identity completely, but the pig iron does not thus lose its char-

* By Alex. E. Outerbridge, Jr.—In the Digest of Physical Tests.

acteristic qualities, and the resultant metal is simply a strong, close grain cast iron, which has neither chemical nor physical relation nor resemblance to steel, and, therefore, the popular term "semi-steel" is misleading.

With regard to the novelty of the discovery, it can be shown that the process is more than fifty years old, and was practiced in England long ago.

Sixteen years ago, while in charge of the metallurgical department of a carwheel establishment which operated upon the "steeled wheel" patents of William G. Hamilton and George Whitney (a process of melting steel scrap with pig iron to increase the chilling property of the metal), a distinguished engineer, Sir Frederick Bramwell, formerly in charge of the metallurgical and gun-making department of the Woolwich Arsenal, England, visited the works. He was particularly interested in the car-wheel metal mixture of steel and pig iron, and said that it was similar to a process with which he was familiar in his youth called "Stirling's toughened cast iron," and on his return home he wrote to me as follows:

"I have much pleasure in enclosing the specification of Stirling's patent of 1846. See page 3, line 18, forward. . . . Stirling continued to patent metallic alloys up to 1854."

The marked paragraph in the specification is as follows:

"For certain purposes, such as shaftings, cranks for steam engines, girders or beams, guns or ordnance, and where a metal possessing greater tenacity or strength than ordinary cast iron is required, and where it is an object to vary the degree of hardness, I make a mixture of wrought iron and cast iron as follows: (Here follow details which are unnecessary to the elucidation of this topic.)

"I would remark that cold blast iron, or iron containing the lesser quantity of carbon, will require a smaller addition of wrought iron than hot blast iron, or iron containing a larger quantity of carbon; but I find the addition of from about one-third to one-fifth of wrought iron to answer well in the generality of cases where increased strength, toughness, and tenacity are required. The above compound may also be made of iron from the puddling furnace after it has been treated, so as to get rid of the scoria, but a larger proportion of such iron will be required. These mixtures of cast and wrought iron may be conveniently called 'toughened cast iron.'"

Wrought iron and steel are so nearly alike in composition that they may be considered as identical for the practical purpose of melting with pig iron, the advantage, if any, resting with wrought iron, as that is a purer metal than steel.

The term which Stirling applies to his metal is not "semi-wrought iron" nor "semi-steel," but "toughened cast iron"—perfectly correct designation.

It is claimed that castings made of semi-steel have extraordinary strength. Published tests show as high, I believe, as 40,000 pounds tensile strength per square inch, or possibly more. Does this really represent the strength of a casting, or simply the strength of a comparatively small test-piece?

Cast iron differs radically from cast steel, not only in its composition and its physical properties, but in the fact that it is subject to great modification of its properties according to the rate of cooling of the mass. A large and a small casting poured from a ladle of steel will not greatly differ in the quality of the metal, but two castings of different size poured from one ladle of cast iron may be entirely different in the character of the metal. If the metal is high chilling iron a small casting may be perfectly white, hard as flint and brittle as glass. A large casting from the same ladle may be perfectly gray, tough, and ductile. A medium-sized casting may have a "lively" gray color, a close crystalline fracture, and higher tensile strength, with comparatively little ductility or resilience.

The rate of cooling is such an important factor in determining the quality of cast iron that it is entitled to be regarded as a characteristic function of the metal. For these and other reasons the recent suggestions of Dr. R. Moldenke regarding the importance of the adoption of a standard system of preparing test bars for cast iron which will indicate, approximately at least, the strength of the castings they represent are both timely and valuable.

The contributions of Thos. D. West, S. S. Knight, Malcolm McDowell, and some others, have also advanced foundry scientific literature to a much higher position in the estimation of chemists and metallurgists than it formerly held.

More or less vague claims are made for the beneficial effect of adding to semi-steel small doses of various "medicines," usually in the shape of coarsely ground or crushed alloys into the ladles of molten metal, but it is not difficult for the chemist or metallurgist to ascertain what alloys of metals, or chemicals, are suitable and available for treating cast iron in the ladle or in the cupola; and while I believe that such treatment may be, and often is, beneficial, I am exceedingly skeptical regarding many claims that have been put forward in recent years, with the accompaniment of elaborate tables that give an air of scientific accuracy or acumen to such disquisitions, but are sometimes found on closer scrutiny to be full of contradiction and absurdity. While I do not desire herein to criticise any particular writer or article, I think it is time to call a halt upon hasty compilations of half-digested experiments of amateurish investigators, which are put forward often through the medium of proceedings of technical societies of high standard. More careful examination of such papers before acceptance would avoid the dissemination of erroneous statements, or the necessity of withdrawing them after they have appeared in print.

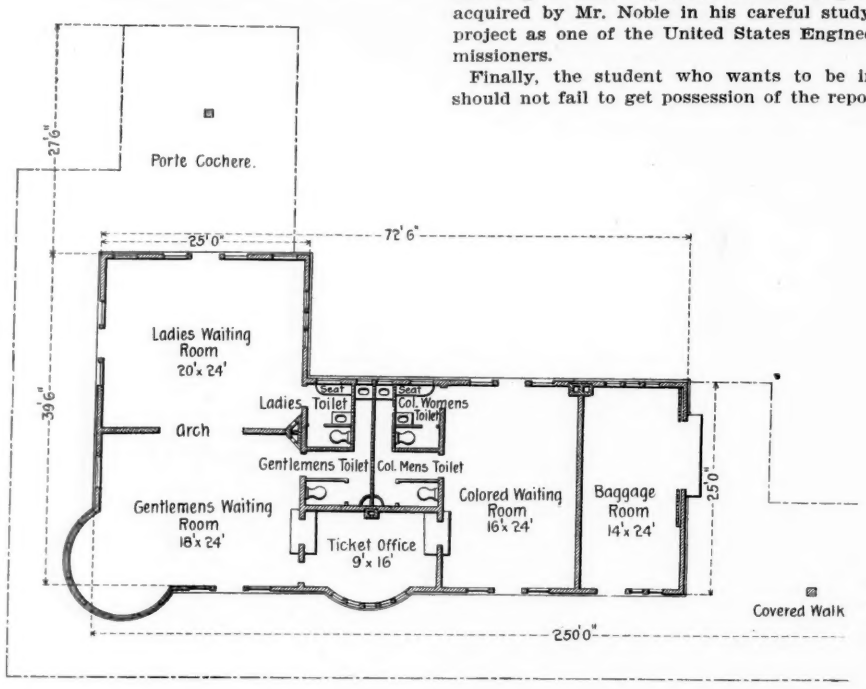
With respect to the claims for so-called semi-steel, I reiterate my statement made at the beginning of this paper, that there is no such metal, and that the metal so called is by no means new to metallurgists. I do this, as already stated, for the purpose of inviting contradiction to my statement of facts, and not to disparage the work of any individual.

I am a seeker of knowledge, and wish to be assured of the correctness of that little which I have gained in a long course of years, or else apprised of my errors. An important contribution to this literature, which bears critical examination, entitled "Value of Metalloids in Cast Iron," was presented by Major McDowell to the Western Foundrymen's Association Jan. 19, 1898. Tests made at the Watertown Arsenal of two bars of Major McDowell's "cupola steel" cast 1½ in. round, turned to 1.129 in., showed tensile strength 42,820 lbs. and 46,400 lbs. per square inch. Two bars cast 1 in. square, turned to .564 in., showed 45,840 lbs. and 49,200 lbs. tensile strength per square inch. It will be noticed that the smaller bars were the stronger. The bars used by the Major to determine the "machinability" of the metal were 4-in. diameter.

Had the tensile test bars been cast of this size, or larger, and turned down to 1.129 inch, I believe that the strength per square inch would have been far less, for the published analysis of the metal indicates that it is strong cast iron, subject to the law of cooling of that metal, which I have endeavored to enunciate in this and other papers upon the subject.

Santa Fe Passenger Station at Houston.

Railroad engineers interested in the problem of furnishing varied passenger station facilities within a limited area, or at moderate expense, will be interested in the plan lately prepared by the Gulf, Colorado & Santa Fe for a passenger station at Houston, Tex., which is shown herewith. This building is of stone up to the window sills and brick above, and has a stained shingle roof. It is surrounded by covered platforms, as shown in the drawing. The length of the platform and roof on the front or track side is 250 ft. or 177 ft. 6 in. to the right of the building. The building is only one story in height, but the circular bay window at the corner is surmounted by a tower of moderate height, giving a pleasing effect and relieving the apparent flatness. The interior finish is oak and the windows are of plate glass. The floors are of maple. The general contractor is J. M. Archer of Dallas.



Passenger Station for the Gulf, Colorado & Santa Fe, Houston, Tex.

The Isthmus Canals.

The editor of Harper's Magazine is doing a good work in publishing valuable facts and opinions on the matter of canals across the Isthmus. While the Nicaragua Canal now sleeps it will be lively enough after the war is over and when the report of the Commission is before Congress. It is well, therefore, for those who are interested, or are likely to be interested in this project, to arm themselves with a little information.

In the February issue of Harper's Magazine they will find a paper by Senator Turpie, entitled "Projects for an Isthmian Canal." It is an excellent summing up in a brief form and in simple language of the main points in the history of the Nicaragua Canal matter.

In the April issue appears an article by Mr. Worthington C. Ford, Chief of the Bureau of Statistics of the Treasury Department, entitled "Commercial Aspects of the Panama Canal." Mr. Ford makes a broad study of trade and industrial conditions in the oriental countries and concludes his article by saying that "the existing lines of trade seem sufficient to carry the products between countries that are in a line with an isthmus canal. To multiply ships will not make trade as the products to be traded in must first be raised. A survey of the East and its needs and supplies leads to the conviction that an economic revolution must take place before any great change in production and expansion of commerce can be expected. In South America the centers of production are on the eastern coast and these receive little demand from Asia or the west of the United States. What is obtained from the west coast of South America will bear transport round the Horn. The carriage of merchandise between the Atlantic and Pacific coasts of the United States alone may offer a prospect of some small increase, but this increase cannot be measured. The rise of the Suez passage in importance is no gage of a Panama canal. . . . My conclusion is that a canal would be an undoubted commercial convenience; it is not a necessity. It will not result in an immediate or extensive development of trade among the continents, and the commercial interests of the United States in any event are of even less importance (in this canal traffic) than the interests of Europe."

In the May issue will appear a paper by Colonel Ludlow on "The Trans-Isthmian Canal Problem," with a map. It will discuss the engineering, the cost and the future of the Nicaragua Canal. On all these points Col. Ludlow can speak with great authority.

Still another source of information of great value is a paper by Mr. Alfred Noble, entitled "Some Engineering Features of the Nicaragua Canal," which appears in the February number of the "Journal of the Western Society of Engineers." This paper was read at the February meeting of that Society, and discussed by Mr. Morison and other members, and it gives much opinion and knowledge of facts acquired by Mr. Noble in his careful study of the project as one of the United States Engineer Commissioners.

Finally, the student who wants to be informed should not fail to get possession of the report made by Messrs. Ludlow, Noble and Endicott, which is published as a Congressional document.

American Railway Association.

The American Railway Association held its spring meeting at Louisville, Ky., April 6. The association now represents over 160,000 miles of railroad. There was a large attendance, but not much important business was done. The date appointed for the spring change of time tables is May 15. Mr. A. W. Johnston, General Superintendent of the New York, Chicago & St. Louis, was chosen a member of the Executive Committee in place of Mr. J. Q. Van Winkle. In all the other elections the present incumbents were retained.

The Train Rule Committee made a report answering certain inquiries concerning the interpretation of rules. With regard to the general revision of the Standard Code, the report says that "the committee considers itself instructed to proceed with the utmost caution. While decided changes have been discussed, great conservatism has been exhibited in the treatment of every queston presenting itself. It is not too much to say that the progress in the assimilation of views is sufficient to justify the hope that the committee may be able to present a complete report to the association at its fall meeting." The committee has also been engaged during the past six months

with the Joint Committee on Interlocking and Block Signals in considering a revision of the definitions, requisites of installation and rules for the several block systems.

The Committee on Interlocking and Block Signals reports that it has held several meetings and is revising the definitions, requisites of installation and rules for block signaling with a view to harmonizing these with the interlocking regulations. The committee hopes to be able to present a report at the October meeting.

The Committee on the Metric System made a report consisting chiefly of a letter from Mr. L. Weissenbruch, Secretary of the International Railway Congress, and Chief Engineer of the Belgian State Railroads. Mr. Weissenbruch says:

"In Belgium, and in general in all the countries which are officially using the metric system, the freight tariffs are based upon the metric quintal of 100 kilograms (220.5 lbs.) for fast service and upon the metric ton (2,205 lbs.) for slow service, with fixed minimums. The rates are calculated by lots of ten kilograms (22 lbs.). The standard gage of track of our railways is 1,435 millimeters [4 ft. 8.496 in.] measured between inner sides of the heads of the rails.

These standards are uniform for all European railways which adhered to the Berne Convention of May, 1886, namely, Germany, Austria, Hungary, Italy and Switzerland. Other countries, such as France and Belgium, have adhered since 1886. The technical conference of Berne also adopted a number of other standards which are all fixed in millimeters. The folded wooden rule is most employed, and it answers for all business purposes. They are of all prices, and those who wish to make use simultaneously of feet and inches (Brabant, French or English) have these measures inscribed on the reverse side of the metric rule.

We have very constant intercourse with England and, while they do not use much more in Belgium the old Brabant feet and inches, they employ sometimes the English measures which they do not use otherwise. For this reason, few countries on the Continent have as much occasion to compare the advantages and the inconveniences of the two systems of measurement.

Mechanics working at times for the English still often use feet and inches. They use a rule, which folds in eight parts and has 1.22 meters—48 in.—4 ft. This is the one that replaces most advantageously the old rule of 2 ft. for the period of transition. . . . It often happens that our workmen have to repair machine tools made in England, all the dimensions of which are given in feet and inches. In this case they convert the measure into the metric measures, stopping at the half milimeter.

As Secretary General of the Railway Congress and from scientific interest, I am happy to understand that the metric system has some chance of being adopted in the United States; but as a citizen of Belgium I may perhaps regret it, because it would greatly aid the Americans to compete with Belgian industries in countries to which they export.

The next meeting of the American Railway Association will be held in New York City October 12.

Compressed Air on the Holland Torpedo Boat.

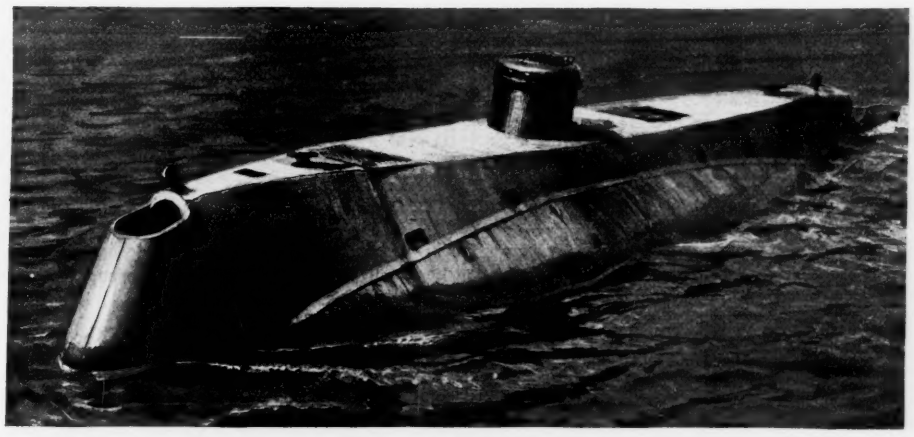
The Holland torpedo boat is 53 feet long, 11 wide amidships, and of 75 tons displacement. The hull is made of steel plates riveted to a steel skeleton frame. Amidships is a conning tower so made as to extend from two to three feet high, or telescoped flush with the hull. Within the hull, immediately below the conning tower, are the two rudders, one for surface sailing, the other to regulate the depth at which the boat is operated when submerged, and the speaking tubes, electric bells and a table connected with apparatus for manipulating a camera lucida, used when the boat is submerged for portraying the appearance of the surface for miles around. The view is secured by means of a steel tube thrust above the water and fitted with camera apparatus.

There are three sources of energy for propelling the boat above and below the water, expelling water, discharging torpedoes and dynamite guns and lighting the ship internally and externally; these sources are compressed air, gasolene and electricity. The most important agent is compressed air, without which it would be impossible to operate the boat five minutes under the sea. The air compressor is an Ingersoll-Sergeant Drill Co.'s single-acting compressor; belt driven from a gasolene engine when the boat is on the surface, and from an electric motor switched to a storage battery when the boat is submerged. The compressor is capable of compressing air to 2,500 pounds pressure; the diameter of the low pressure cylinder is 6 inches; the high-pressure cylinder is 1¾-inch diameter, with 8-inch stroke. Both cylinders are immersed in a water box, which cools the air during compression. Solid discs serve for fly wheels. The space occupied is only six feet and five inches long and two feet high.

The highest value of the compressed air is for the respiration of the crew, numbering ten men. For this purpose the air is expanded through two reducing and one regulating valves, and is set free at the normal atmospheric pressure. Six times the requisite volume of air is available; the surplus air is used for counteracting the deleterious effects of the ventilating pumps, which would produce a near approach to a vacuum if the air supply from the tanks was interrupted in its even flow. The steering and diving gear are operated by compressed air, which also maintains the air pressure throughout the boat to equalize the pressure of the sea when the boat is submerged.

The boat is quickly submerged by admitting sea water to a series of steel tanks connected with the compressed air system. A dive of forty feet below the surface is made with safety and comfort in a minute. When the commander signals to elevate the boat from the depths, air is forced into the water tanks under high pressure, and, as the water is expelled, the boat rises swiftly to the surface. The air tanks have been tested to stand a pressure of 3,000 pounds to the square inch, and are calculated to hold out for a submergence lasting ten hours, but, if the supply should fail after nine or ten hours, the tanks can be replenished by means of a tube projected to the surface as a suction pipe.

The armament of the boat consists of one dynamite gun, one automobile torpedo tube and one aerial torpedo tube. These tubes and gun are worked by compressed air, which not only launches the torpedoes or high explosive shells, but immediately restores to the boat the weight of 800 to 1,000 pounds lost when a projectile or mass of dynamite is discharged. The muzzle energy of the dynamite gun is 750 tons.



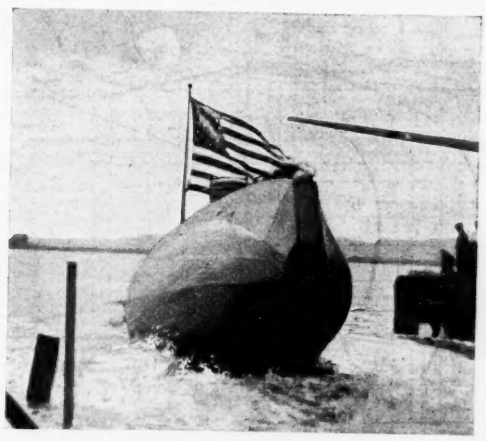
The Holland Torpedo Boat.

Notes on German Railroads.

BY J. PEARSON PATTINSON.

Of German railroads it is impossible to treat with the fullness adopted in the writer's previous articles dealing with the railroads of Belgium, Italy and Spain. The vast extent of the German railroad system and the difficulty of obtaining information from all the administrations forming this system render it impossible within the limits of a single article to deal completely with the subject. Some of the salient points of German railroad working will therefore be alone touched upon in what follows, and for further information especially concerning train speeds the reader may be referred to the Railroad Gazette of Oct. 2 and Dec. 11, 1896, where that branch of the subject is dealth with.

Passenger Rolling Stock.—Perhaps the most interesting feature in the working of the German railroads is the comfort and general accommodation afforded to pas senger traffic. Within recent years great improvements have been made, and the almost general introduction between the chief towns of the long vestibuled trains composed almost entirely of eight-wheeled stock, known variously as "D" (abbreviation for Durchgehende) or "Harmonica" trains, has rendered long distance travel in Germany about as comfortable as in any other country. These fine "D" coaches weigh, as a rule, about 29 to 31 (English) tons, and give accommodation for first-second and third-class passengers—the first and second-class traveling in composite vehicles affording, as a rule, 4 to 8 seats for first and 20 to 24 for second-class passengers. The dead weight of the coach is therefore quite an (English) ton for every seat, but this isonly what might be expected considering that



The Holland Boat Rising.

of two marks for first and second and of one mark for third class is demanded in these trains. This entitles the passenger to the sole use of the seat allotted him during his journey, and this fact is indicated on a metal tablet in the corridor outside the compartment and also by another tablet above the seat paid for. The arrangements for refreshments are good. A printed menu is placed in each compartment and the choice of eatables and drinkables is tolerably wide and the prices are cheap. Uniformed waiters perform the necessary attendance and a female servant is carried in the train to look after the toilet arrangements. A small charge of 10 pfennigs is made for the use of a clean towel and a minute piece of soap. This plan might with advantage be adopted on some of our English roads, where soap is not infrequently absent in the lavatories and where the towels are occasionally dirty.

But, in spite of the rapid introduction of "D" trains on German railroads, most of the express trains are still made up of four or six-wheeled carriages. These are very heavily built and weigh from 13 to 16 tons in the case of the four-wheeled stock, and from 17 to 21 for the six-wheelers. Most of these vehicles are built on the English compartment plan, but a few here and there have a side corridor. The firsts and seconds are very comfortable and are upholstered and decorated in much the same way as the "D" coaches, though perhaps with less finish and ornament. They are distinctly better, although some English authorities will not have it so, than similar class coaches in Great Britain. The thirds, however, are behind those of England and Scotland, but are, at the same time, clean and bright vehicles, tolerably roomy and with fair window space. They are, unlike the third class in many other continental countries, quite good enough for respectable people to travel in, and are equipped, as in the higher classes, with steam heat, alarm signal, and (frequently) with lavatory.

Passing over the local and branch line rolling stock, which, as in other European countries, is not nearly so good as that used in the through services, our attention is arrested by the much-used fourth class of Germany—a type of accommodation not often seen elsewhere. Here, as will be seen later, the kilometer-tariff is very low, and much comfort cannot be expected. The vehicle is generally in two large compartments only (one for men and the other for women), and the seats are placed around the sides and ends of the carriage, leaving the center space available for standing room or for articles of luggage, etc. The window space is very limited, but the carriages are certainly cleaner than the third class of Italy, Spain and many other lands. Access is obtained by end platforms.

An interesting type of carriage is that used on the Stadtbahn of Berlin. There are no first-class vehicles in service, but the seconds are very comfortable and extremely roomy considering that the service is an urban one. They are on four wheels, weigh 12½ tons each and give sitting space for 32 persons. Well cushioned and well lighted, with monitor roofs and neat fittings, they are far in advance of the wretched vehicles used in similar service in London, and even the thirds—although without cushions—are much cleaner and brighter than many of those in use on the London underground lines.

Before leaving the discussion of the passenger rolling stock it will be as well to remember that sleeping accommodation is very cheap on the Prussian railroads.

A small supplementary fare of a few marks, according to distance, entitles the passenger to either a first or second-class sleeping berth. Another most excellent feature is the liberal provision of through vehicles which connect, without change of carriage, all the large towns of the Empire, however remote from one another. These are dovetailed into one another in quite a marvelous way, and at any of the large junction stations in Germany it is quite wonderful to notice the regularity with which these vehicles, coming from far-distant points—perhaps over long stretches of single track and over the lines of various administrations—turn up to their appointed time. In this particular—the provision of long-distance through carriages—Germany stands easily first among the countries of the Old World, even surpassing England, where, however, the enterprise of the wealthy private corporations has done much in this respect.

Passenger Fares.—Some brief allusion may here be fitly made to the rates charged for the conveyance of the various classes of passengers. In Prussia this is usually 8, 6, 4 and 2 pfennigs per kilometer for first, second, third and fourth classes respectively by ordinary trains, the equivalent per mile being about 1½d., 1⅛d., ¾d. and ⅜ of a penny. By express train excess fares are charged. For return or round-trip tickets, the tariff is 12, 9 and 6 pfennigs, or, per mile, about 1½d., ⅝d. and 3/16d.; a considerable reduction, and between large centers of population the reduction is still greater, the single trip fare between Köln and Berlin, for instance, being 52.30, 38.80 and 27.20 marks, according to class, and the return only 69.80, 52.30 and 34.90 marks. The writer is scarcely able to compare these figures as to rates per mile with those charged in the United States, but it may be roughly stated that the German rate per mile for second class will probably closely approximate to the English third-class rate, and any one who is familiar with the rolling stock of either country will agree that the German seconds are far more comfortable than English thirds, and are, indeed, often better than English firsts.

An interesting feature in passenger tariffs is that afforded by the Berlin Stadtbahn before referred to. Here the fares are 15 and 10 pfennigs for second and third class respectively, available up to the fifth station from the starting point. Beyond this, the fares are 30 and 20 pfennigs (about 420 pfennigs go to make a dollar) and as these are available over either the Nord or the Sud Ring, respectively, 21¼ and 23½ miles long, it will be seen that urban railway travel in Berlin is remarkably cheap.

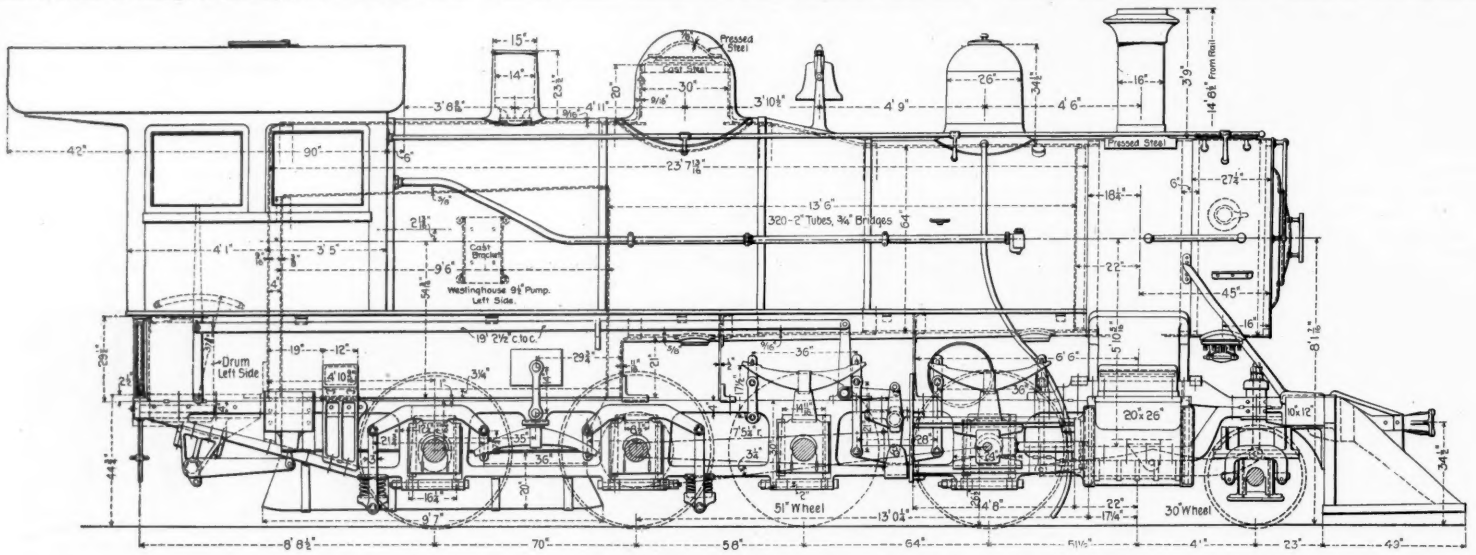
Stations.—The large towns are rarely without a fine, and in many cases monumental railway station. That at Frankfurt-on-the-Main is well known, and its general arrangements, palatial waiting and refreshment rooms, spacious booking hall and corridors is the theme of universal admiration. Cologne has a still newer station, which almost vies with Frankfurt, and Dresden is just building a superb structure. Munich, Bremen, Stuttgart, Hanover, and the Anhalter station at Berlin are all very magnificent and provide every accommodation necessary for the comfort and convenience of the passenger.

At important junctions the buildings are often of vast extent—this being specially noticeable on the lines east of Berlin on the way to the Russian frontier. The restaurant accommodation is particularly extensive. The platform is screened to give protection from the weather, but is only slightly raised above rail level, and the passengers waiting for their trains are usually either congregated in the restaurant or on a section of the platform railed off and frequently provided with seats and tables. On the arrival of trains at platforms other than the main *trottoir*, passengers either reach this latter by a subway or cross the lines under the surveillance of the staff. At the roadside and country stations generally the same arrangements prevail. At nearly all these, however small, it is possible to obtain light refreshments, and in this respect the German lines are quite unapproached.

Our general estimate, then, of German passenger travel as regards comfort, convenience and accommodation must be a high one.

Speed.—Speed is noticeably lower than in England and the United States, and express train services far less frequent. These, of course, are serious drawbacks. This subject has, as stated in the opening remarks, been previously discussed, and it is scarcely possible, without a very considerable expenditure of time, to furnish any exact statistics as to the amount of express speed in the Empire, and, without *all* the working timetables of the various administrations, a census of express speed, such as we have furnished in previous articles, for Belgium, Italy and Spain, would be well nigh impossible. The vastness of the German system also precludes us from giving details of the gradients as in the other articles referred to. Speaking in most general terms, it may be said that there are few severe long grades in Prussia, but in Saxony, Wurtemberg and Baden heavy ascents (many of them long stretches at 1 in 50 or thereabouts) are frequently met with, but speeds are never high on these severe portions of the line. Locomotives, too, as might be expected from so great a variety of conditions to be faced in working the traffic over so wide an area, are of numerous types, and detailed description is impossible.

Our article may fitly close with a run made in actual daily practice over part of the course between Berlin and Cologne. The run gives a good idea of the best class of German express work, as the train is scheduled, especially from Brandenburg to Magdeburg, at a fairly good rate of speed, and the load is not light. The engine used was one owned by the Magdeburg administration, and of usual four-coupled type.

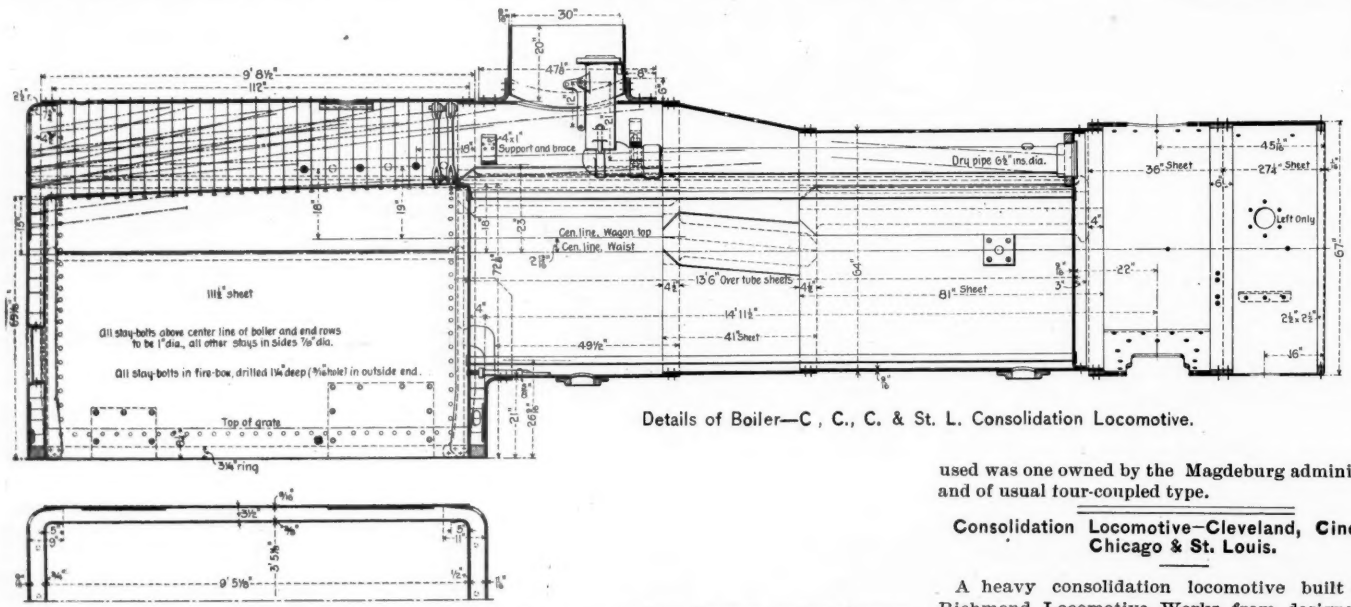


Consolidation Locomotive for the Cleveland, Cincinnati, Chicago & St. Lonis Railway.

Built by the Richmond Locomotive Works, *Richmond, Va.* *Designed by* Mr. William Garstang, *Superintendent of Motive Power.*

BRANDENBURG TO BRUNSWICK (103¾ MILES IN 133 MINUTES)—BERLIN COLOGNE EXPRESS.

Distance.	Stations.	Schedule time.	Actual time.	Remarks.
Kils		p. m.	h.m.s.	
	Brandenburg, dep	1.59	2. 0.33	Engine 31 (Magdeburg administration) and 6 corridor carriages (179 tons).
15.2	Wusterwitz		2.12.35	
21.8	Caderschleuse		2 17.0	
30.2	Genthin		2.22.43	
37.5	Bergzow-Parchen		2.27.47	
56.3	Burg		2.40.30	
63.7	Möser		2 46.0	
69 2	Gerwisch		2.49.50	
72.4	Biederitz		2.51.50	Ran slowly from Biederitz into Magdeburg over bridge.
80.6	Magdeburg. arr.	3 3	3. 1.25	
	" dep	3 5	3. 7.2	
83.5	Magdeburg-Sudenburg		3.10 23	
90.0	Niederndodeleben		3.16.20	
95.1	Wellen		3 21.0	
98.7	Ochtmersleben		3.24.20	
101.6	Dreileben-Drakenstedt		3.26.43	
110.4	Eilsleben		3.33.48	Slowly through Eilsleben.
115.6	Wefensleben		3.38.10	
119.2	Marienborn		3.41.19	
128.2	Helmstedt		3.48.53	
135.6	Frellstedt		3.54.54	
144.0	Königslutter		4. 1 27	
148 6	Bornum		4. 7.21	Very slowly into Brunswick through goods yards.
167.0	Brunswick....arr.	4.20	4.19.7	



Details of Boiler—C., C., C. & St. L. Consolidation Locomotive.

Consolidation Locomotive—Cleveland, Cincinnati, Chicago & St. Louis.

A heavy consolidation locomotive built by the Richmond Locomotive Works from designs of Mr. William Garstang, Superintendent of Motive Power, is now in use on the Cleveland, Cincinnati, Chicago & St. Louis, and has given such satisfactory service that it will probably be adopted as the standard freight engine for that road. Mr. Garstang tells us that the poorest fuel performance made by the new engine up to the present time is 3.48 lbs. of coal per car mile, or .09 lb. of coal per ton mile. The weight

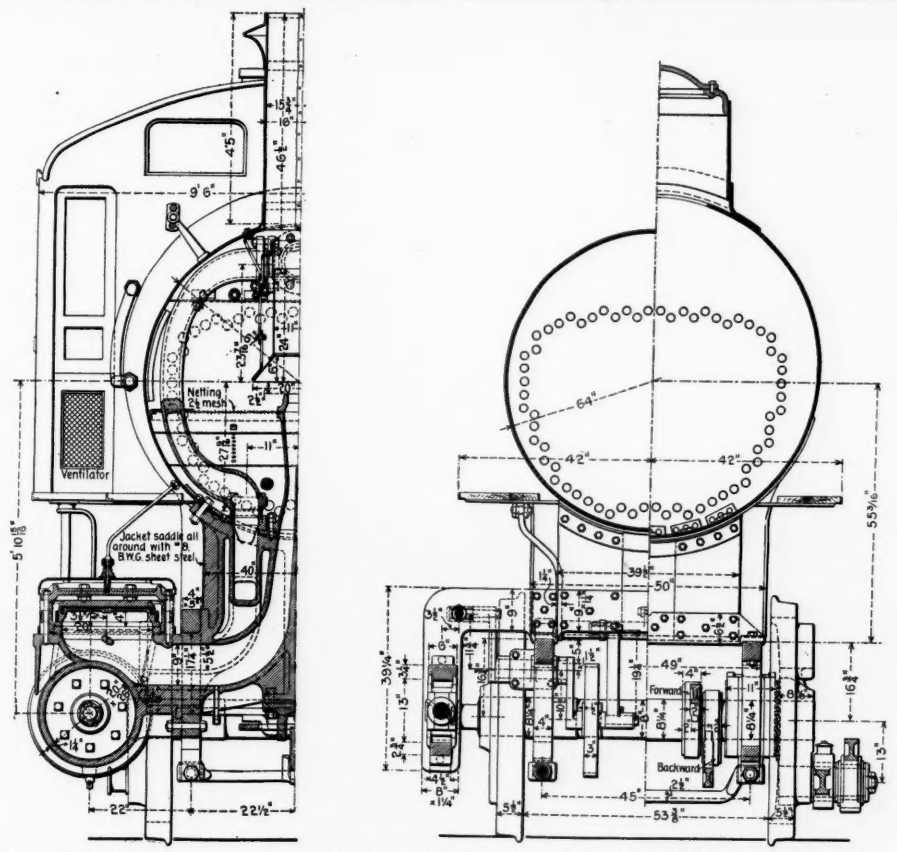
of trains hauled by the present standard freight engines is 1,050 tons, while the new locomotive is handling trains of 1,500 tons, excluding the weight of the engine and caboose, on grades of over 45 ft. per mile, being an increase in train weight of nearly 50 per cent. In designing the new locomotive it was intended that it should be able to handle about 33 per cent. greater tonnage than the heaviest engine then in use.

The principal features of engine No. 700 is shown by the accompanying engravings. It will be noted that the back of the boiler extends but 3 ft. 5 in. into the cab, leaving a greater clear space on the foot plate than is usually provided in this class of engines. Also, all the valves and levers are arranged to be within easy reach of the engineman. The total weight in working order is 150,500 lbs., of which 134,650 lbs. is on the drivers; the driving wheels are 51 in. in diameter and the cylinders are 20 in. in diameter by 26 in. stroke. The boiler, of which the detail drawings are given, is of the extended wagon top type, 64 in. in diameter at the barrel, and carries a steam pressure of 190 lbs. per sq. in. The boiler, cylinders and saddle are covered with magnesia sectional lagging and jacketed with planished iron. Because of the prevailing practice on this road of running locomotives long distances the tender has been made unusually large, space being provided for 12 tons of coal and 4,500 gals. of water. Fox pressed steel trucks are used under the tender and cast steel is used for cylinder heads, driving wheel centers, pistons, cross heads, dome cap, auxiliary dome, steam chests and steam chest covers, while the boiler front, dome, stack base and sand box are made of pressed steel.

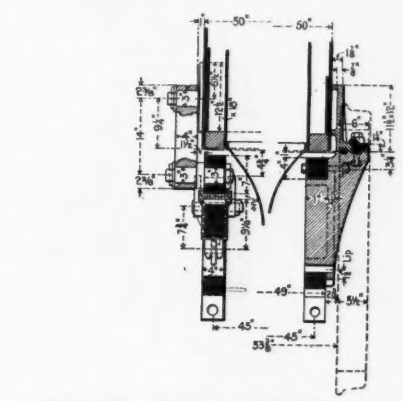
As special equipment Coale & Kunkle safety valves are used, Dunbar piston packing, Jerome metallic packing for piston and valve rods, A. French springs, Leach sanding device, Monitor injectors and Janney couplers. Westinghouse air brakes are used on both engine and tender, together with a 9½ in. air pump.

The principal general dimensions are as follows:

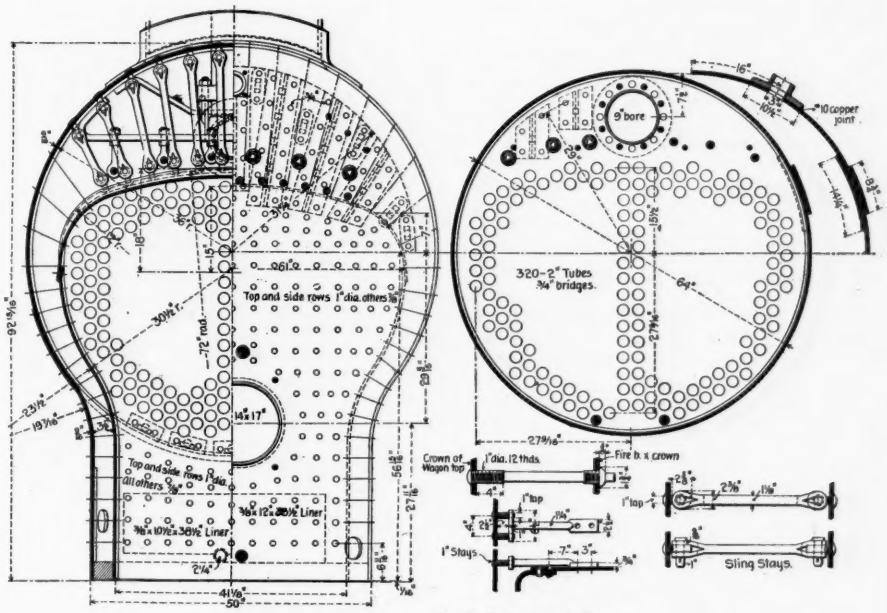
Description.	
Type	Consolidation
Number	700
Name of builder	Richmond Locomotive Works
Name of operating road	Cleveland, Cincinnati, Chicago & St. Louis Ry.
Gage	4 ft 8½ in
Simple.	
Kind of fuel to be used	Bituminous coal
Weight on drivers	134,650 lbs.
" " truck wheels	15,850 lbs.
" total	150,500 lbs.
General Dimensions.	
Wheel base, total, of engine	23 ft. 8½ in.
" " driving	16 ft. 0 in.
" " total (engine and tender)	51 ft. 5½ in.
Length over all, engine	42 ft. 2 in.
Height, center of boiler above rails	8 ft. 1½ in.
" of stack, " "	14 ft. 8 in.
Heating surface, firebox	171.05 sq. ft.
" " tubes	2,260.00 sq. ft.
" " total	2,431.05 sq. ft.
Grate area	35.23 sq. ft.
Wheels and Journals.	
Drivers, number	8
" diameter	51
" material of centers	Cast steel
Truck wheels, diameter	30 in.
Journals, driving axle, size	8¼ x 11 in.
" truck " "	5¾ x 10 in.
Main crank pin, size	6 x 6½ in.
Cylinders.	
Cylinders, diameter	20 in.
Piston, stroke	26 in.
" rod, diameter	3½ in.
Kind of piston rod packing	Metallic
Main rod, length, center to center	10 ft. 1½ in.
Steam ports, length	20 in.
" " width	1¼ in.
Exhaust ports, length	20 in.
" " width	2½ in.
Bridge, width	1⅞ in.
Valves.	
Valves, kind of	Richardson balanced
" greatest travel	5½ in.
" outside lap	⅞ in.
" inside lap or clearance	0 in.
Boiler.	
Boiler, type of	Extended wagon top
" working steam pressure	190 lbs.
" material in barrel	Carbon steel
" thickness of material in barrel—	⅝, 5/8 and 1 1/16 in.
" diameter of barrel	64 in.
Seams, kind of horizontal—	Double welt, sextuple riveted butt
" " circumferential	Double riveted lap
Thickness of tube sheets	½ and ⅝ in.
" crown sheet	⅜ in.
Crown sheet stayed with	Radial stays
Dome, diameter	30 in.
Firebox.	
Firebox, length	9 ft. 6 in.
" width	3 ft. 5⅞ in.
" depth front	72 1/16 in.
" back	69 1/16 in.
" material	Carbon steel
" thickness of sheets	⅜ in.
" brick arch?	No.
" water space, width—	Front, 4 in.; sides, 3½ in.; back, 4 in.
Grate, kind of	Rocking and drop
Tubes.	
Tubes, number	320
" material	Charcoal iron
" outside diameter	2 in.
" length over sheets	13 ft. 6 in.
Smokebox.	
Smokebox, diameter	67 in.
" length	67 in.
Other Parts.	
Exhaust nozzle, single.	
" " permanent.	
" " diameter	5¼ in.
" " distance of tip below center of boiler,	2½ in.
Netting, wire or plate	Both
" size of mesh or perforation	2½ x 2½ in.
Stack, straight.	
" least diameter	16 in.
" greatest diameter	16 in.
" height above smokebox	3 ft. 9 in.
Tender.	
Swivel trucks.	
Tank capacity for water	4,500 gals.
Coal capacity	12 tons
Kind of material in tank	Steel
Thickness of tank sheets	1/8 in. and ¼ in.
Type of under frame, wood or iron	Wood
Type of truck	Fox pressed steel
Truck with swinging motion or rigid bolster	Rigid
Type of truck spring	Elliptic
Diameter of truck wheels	36 in.
Diameter and length of axle journals	5 x 9 in.



Consolidation Locomotive for the Cleveland, Cincinnati, Chicago & St. Louis Railway.—Cross Sections.



Section Through Front and Back Expansion Supports.



Back Tube Sheet Stays.

Details of Boiler.

The Cullom Bill.

The several propositions looking to the amendment of the Interstate Commerce law which are now under consideration by the Senate Committee at Washington are embraced in a bill presented by Mr. Cullom on Jan. 22, numbered S. 3354. The first section gives the Interstate Commerce Commission absolute power, after notice and hearing, to enforce the long and short haul clause of the present law (section 4), subject, however, to review by the courts as provided in a subsequent section. Section 2 amends Section 6 of the present law. This requires the publication of all tariffs, including rates to foreign countries. Tariffs must show separately terminal charges, storage charges, privileges, etc. All traffic agreements must be filed with the Commission. Changes in tariffs must be announced 60 days in advance, unless the Commission, for good cause shown, allows shorter notice. Intermediate lines must file acceptance of joint tariffs. No carrier may lawfully participate in interstate transportation unless tariffs have been filed and published. Disobedience of this section involves a fine of $5,000; and freight shipped through a foreign country on an unpublished rate cannot re-enter the United States, except on payment of customs duties. Every rate legally in effect shall be conclusively presumed reasonable until the Commission challenges it. When the Commission is of opinion that a rate is unreasonable it shall determine what are and will be reasonable rates, and shall prescribe the same, to take effect on a certain day. In reducing a joint rate the Commission may determine the divisions, if the roads do not agree. When a rate has been reduced, and the reduction has not been successfully

challenged, an aggrieved party may apply for the repayment of excess charges on any bills he may have paid since the Commission first began proceedings against the carrier. Provision is made for an order to the road to make restitution and for enforcing this order. A rate established by the Commission shall not be increased without the consent of the Commission.

Section 3 amends Section 10. This strengthens the criminal clauses, making attempts to secure secret reductions equally criminal with successful acts in that direction. Any charge, demand, collection or reception of, or offer to make or accept, any illegal sum is a misdemeanor. Penalties in all cases are $5,000. This section applies to all officers, employees, passenger agents, brokers, expressmen, etc. A corporation guilty of an act or omission, which, if done or omitted by an individual, would be a misdemeanor, shall be liable to $5,000 fine. The act or omission of an agent shal be deemed the act or omission of the carrier, as well as of the individual. In proceedings to prove discrimination it shall not be necessary to prove that less favorable rates were offered to other shippers, or to prove the names of such shippers; the publication of rates shall be conclusive evidence that such rates were charged to the general public.

Section 4 amends Section 14, making the published decisions of the Commission competent evidence in the courts.

Section 5 amends Section 15. This prescribes in detail what the Commission may do in correcting rates found unreasonable; it may fix a maximum rate, or, to prevent discrimination, may fix both a maximum and minimum rate; may make divisions between carriers, prescribe conditions of interchange, make changes in classification and amend rules.

Section 6 amends Section 16. This prescribes procedure in the courts. A carrier may ask the United States Circuit Court to review an order of the Commission. The court may instruct the Commission to take further testimony if it believes such testimony could not have been taken before. The case as made up, with such additional testimony, if any, shall then be the record on which it shall be heard by the Circuit Court. The court, in making a decision, must state its reasons. When a carrier enters a petition the court may postpone the enforcement of the Commission's order, but not more than 40 days. If the record plainly shows an error of law or an unjust decision on facts the court may suspend the operation of the order pending the proceedings. Appeals may be taken to the Circuit Court of Appeals and under certain circumstances to the Supreme Court of the United States. An order of the Commission, if not challenged, or if challenged and the court sustains it, shall be known as a final administrative order, and disobedience of such an order subjects the offender to $5,000 fine. Penalties must be recovered by district attorneys, the costs of such prosecutions to be paid for out of the appropriations for the courts.

Section 7 adds a new section to be called 16a. This provides for rehearing of cases before the Commission, but no such application for rehearing shall excuse a carrier from obeying an order of the Commission.

Section 8 amends Section 20. This describes in detail what the Commission may require in annual reports from carriers. The Commission may, if it is found practicable, prescribe a time within which carriers must adopt a uniform system of accounts.

A Grade and Distance Recorder for Reconnaissance.

Mr. John Riddell of the General Electric Company has recently devised and made a little machine for recording slopes and distances in a rapid reconnaissance. It may be mounted on a bicycle or other wheeled vehicle, and in the illustration, Fig. 1, it is shown as mounted on the upper bar of a bicycle. Fig. 2 shows part of a record made with this apparatus mounted on a bicycle ridden from the gates of the General Electric Company's factory to the main street of Schenectady. It will be observed that distances and differences of elevation are recorded. The apparatus is briefly described as below:

The metal cylinder carrying the paper for the record is provided at the lower end with a worm wheel engaging with a worm on a shaft running toward the rear of the bicycle and driven by a lace belt from a pulley on the crank shaft. Movement of the bicycle produces, therefore, revolution of the record cylinder, which unwinds the paper for the record from a small drum.

The marker is mounted on a nut on a threaded vertical rod, movement of which raises or depresses the nut and the marking point. The lower end of the rod is fastened to a horizontal disc free to move clockwise or the reverse. Beneath the disc, and just clearing it on each side, are two smaller discs, at each end of a toothed sleeve, and revolving vertically. Through the sleeve passes the disc shaft provided with a gear wheel meshing into a small gear on the main shaft driven from the crank axle.

Beneath the entire machine is a pendulum having at its upper end a toothed quadrant, meshing into the teeth of the sleeve on the shaft carrying the vertical discs. As the small discs revolve in the same direction, one in contact with the large horizontal disc revolves it clockwise and causes the marker to ascend, the other counter clockwise depressing the marker. The nearer the center of the large disc the small disc comes, the faster the former moves, and the sharper the angle described by the marker.

The pendulum always hangs vertically, and, going up grade, the rear vertical disc is brought beneath

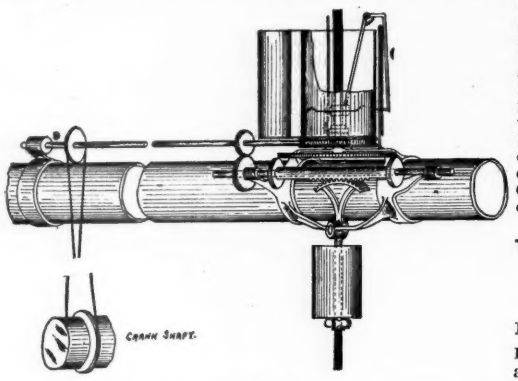


Fig. 1.—Riddell's Slope and Distance Recorder.

the horizontal disc, and the marker moves upward; going down the forward disc comes into play and the marker moves downward. On the level both vertical discs are out of contact with the horizontal disc, and the marker records a horizontal line.

Recent Railroad Policy in India.

Beginning under Lord Dalhousie in 1850, the railway system of India has been strenuously pushed on in face of many difficulties by each succeeding Viceroy, and with the steady and cordial co-operation of the Home Governments. We must bear in mind that for the evolution of a railway policy, India has offered our Government from the very first an absolutely clear field and a free hand. The forces which led, or rather drove, us at home to the railway mania of 1845, although furnishing the motive power for our first steps in India, served only as warnings for our guidance, and the assistance which then, as now, is required by promoters has been accorded on the clear understanding that the State should have full and definite control over their operations, and receive some share of their profits.

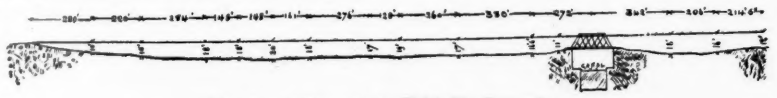


Fig. 2.—A Record by Riddell's Recorder.

Beginning with a well-planned and carefully considered system of trunk lines, the agency for construction and working of which was that of companies, the capital was raised on a guarantee by the Government of 5 per cent., any surplus earnings over this figure being devoted to the repayment of advances made toward this interest. Later on, this stipulation was waived, on the condition that surplus earnings should be shared with the State, but the lines were to become public property after definite periods, either by purchase or the grant of deferred annuities.

This system continued, and, on the whole, satisfactorily, up to 1869-70, when a new policy was inaugurated. Under this, the State itself was in future to make all new railways, and to work them. This policy lasted for another decade, when the pendulum swung back again to the employment of companies under what was termed a "limited guarantee." They were to raise funds for and construct and work "productive" railways; while the direct action of the State was to be confined to lines which did not promise well as to direct fiscal results, but which were required for famine protection, or for military reasons.

The new era was to be one of private enterprise, to which the minimum of assistance was to be given, but, preferably, none at all, save the free grant of land; while State lines were to be made over to companies to be worked on lease, a share of profits over and above certain figures being reserved to Government. For again another decade, say up to 1890-1, this new and intelligible policy was vigorously prosecuted, and resulted in adding about 6,500 miles to the Indian railway system; but by the end of this period railway extension had run down to very small figures. The main reason for this was to be found in the financial difficulties of the Government, due to its currency, and to the consequent substitution of the offer of rupee instead of sterling guarantees.

But a secondary cause of scarcely less force was that the Government did not heartily encourage private enterprise, was always trying to drive hard bargains, and, instead of confining itself to the programme of 1881, it seemed inclined to relegate the unproductive lines to private enterprise, and take the best ones itself; the fact being that the overgrown establishment of the Public Works Department had to be provided with work, or reductions made.

After an attempt in 1893-4 to put some spirit into investors by the grant of so-called "branch line terms," a fresh outburst of activity on the part of the State took place, and a monster programme representing an outlay of something like six millions yearly was brought out by Lord Elgin. This, as might have been expected, has been demolished by the famine and the frontier troubles; works have been ruthlessly stopped, men paid off, but little chance now appears of money being forthcoming for another two years.

The root of all this muddle and trouble is the maintenance of a large Government establishment for the construction and working of railways side by side with that of the companies. A dual system cannot work. Either the State must do all or do none. The first course is now impossible, and the latter must be honestly accepted. It should be enough for the Government of India to control its railway system, and to leave the construction and working to the agency of companies. Funds would then be supplied regularly and punctually for new works, and the working of railways would be conducted on commercial principles, instead of by underpaid officials, whose promotion is dependent, not on results, but on length of service. The continued existence of the dual system has, in point of fact, become a positive evil, an active source of embarrassment to both the Government and the railway companies.—The Economist.

The Prussian Railroad Commission on the Epidemic of Accidents.

On the opening of the Prussian Diet recently the Minister of Railroads submitted a memorial on the provisions for safety on the Prussian State railroads and their effectiveness, the motive for which was that after having held one of the first places in regard to safety and been for a series of years exempt from severe accidents, in the last Summer the State railroads had to lament a series of serious disasters, resulting in the sacrifice of life and health in unusual numbers and arousing general anxiety and distrust. The Minister considered it his duty under the circumstances, though judicial investigation of most of these accidents is still pending, to lay before the representatives of the Kingdom an account of what has been done in past years to prevent accidents, and the condition of the road, and their appliances and of the staff of employes, so far as they affect safety.

The memorial begins with a comparison of accidents on the Prussian State railroads and on other systems, so far as data exist which can properly be compared. The accident reports of non-German countries furnish data for imperfect comparisons only, but those of the lines in other countries of the German Empire are reported in the same way, and those of lines in the German Railroad Union and in Austria-Hungary are so nearly on the same basis as to admit of comparison. Now the memorial finds the average number of accidents per year for the whole period since 1880-81 has been, per million of train miles:

Prussian State railroads	17.2
All German railroads	19.8
Austria-Hungary roads	21.4
All German Railroad Union	20.3

At the same time the density of traffic, as expressed by train mileage per mile or road, was in the following proportion on the four groups: Prussian, 100; other German, 90; Austria-Hungary, 59; German Railroad Union, 79.

The progress in securing safety on the Prussian system is shown as follows: By the number of all accidents, of derailments and of collisions per million of train miles in the first ten years and in the last ten years:

	Number of Accidents.	Derailments.	Collisions.
First ten years	18.7	2.59	2.46
Last ten years	15.6	2.11	1.50

The number of collisions is considered as the best index of the efficiency of measures taken for safety. They decreased nearly 40 per cent. in the last period. Meanwhile train movement per mile of road increased 28½ per cent., and the passenger movement 60 per cent.

The memorial then compares the proportion of passengers killed or injured to the number of passengers carried and finds it to have been 118 in all Germany, 247 in France and 422 in England to 100 in Prussia. As this does not take into consideration the length of journeys, for which the English reports furnish no data, the comparison is of little value. Less imperfect is the comparison of accidents in proportion to passenger train mileage, which gives 110 in all Germany, 129 in Austria-Hungary, 111 in the whole German Railroad Union, 183 in France and 544 in England, to 100 in Prussia. Per million of passenger miles 0.024 passenger was injured in Prussia, 0.031 in all Germany, 0.040 in Austria-Hungary, 0.035 in the German Railroad Union and 0.062 in France. These figures for passengers make the proportions as 100 in Prussia to 127 in all Germany, 167 in Austria-Hungary, 147 in the German Railroad Union and 260 in France.

Comparisons of accidents to employes in all these countries are not given, for lack of data, but the yearly average injured in the 15 years per 1,000 men employed was 5.31 in Prussia and 6.11 in all Germany, and per million train miles was 10.01 in Prus-

sia to 11.01 in all Germany. The above is to set forth what may be called the normal safety, being the average since 1880-81. The memorial then proceeds to show the variations for the half years ending with September, as follows:

	1892.	1893.	1894.	1895.	1896.	1897.
Total number accidents..	941	916	1,004	635	715	811
Per million train miles..	14.09	13.67	15.23	8.89	9.65	10.14

Thus it seems that though the number was greater last Summer than in either of the two years previous it was much smaller than in 1892, 1893 and 1894. What has so disturbed public opinion was not the number of accidents, but the number of fatalities, and last Summer's accidents were unusually deadly. The number of persons killed and injured in the several half years has been:

1892.	1893.	1894.	1895.	1896.	1897.
805	720	746	410	506	685

Even here we see that the casualties, though so much more numerous last Summer than in 1896 and 1895, were less than in any of the three years previous. We must therefore still further limit the cause of the public excitement. In Germany, as here, it is not the number of fatalities, but the number of fatalities to passengers, and especially the number of accidents which have a considerable number of victims. The latter alone attract general attention. Twenty men may be killed in a day here, one at a place, while crossing or walking on tracks, and little notice is taken of it, but if half as many are killed at once in a train accident the whole country rings with it. Now the number of passengers killed and injured on the Prussian railroads in the Summer half years has been:

1892.	1893.	1894.	1895.	1896.	1897.
119	82	70	85	120	230

Thus last Summer the number of victims was nearly twice as great as in any of the five previous years, or 2½ times the average of those years. Per million of passenger train miles the number of passenger victims was 4.73 last Summer, against an average of 2.25 for the five years previous.

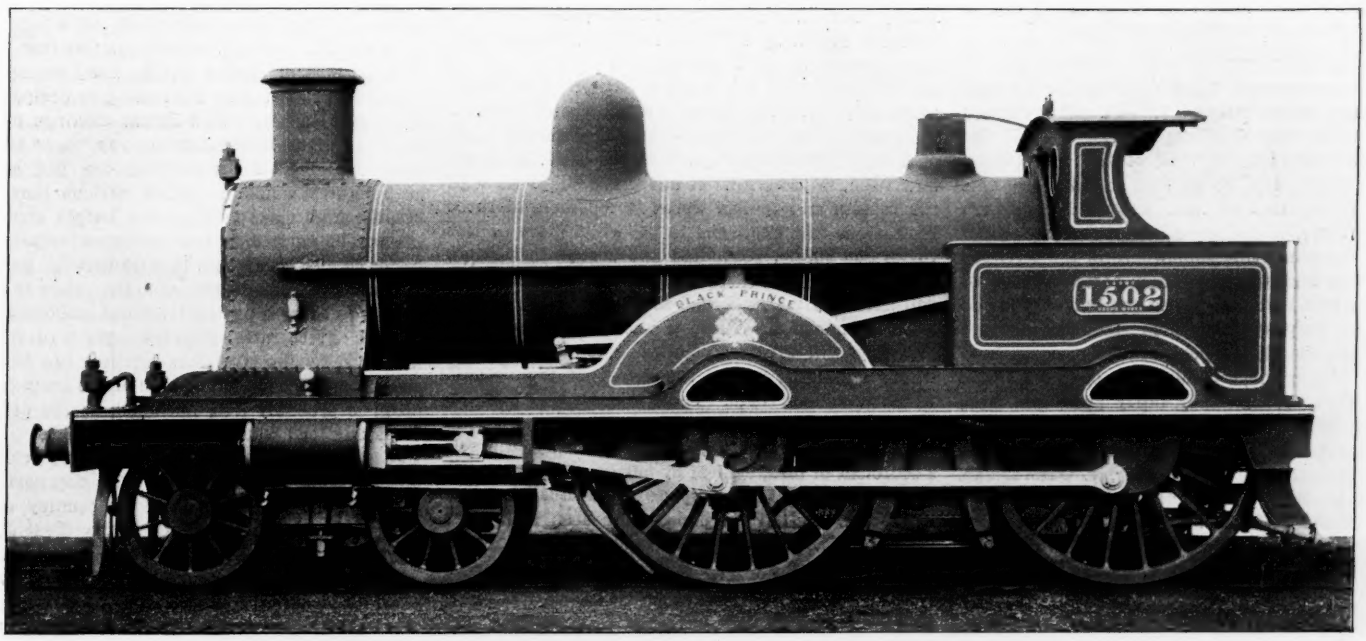
Having shown what the degree of safety actually has been, the memorial proceeds to show what has been done to secure safety. Here the ministry has had for its task what a public administration is seldom asked for, namely, to show that it has not been unduly economical. The Prussian ministry sets forth that it has been improving the roadbed, securing rails of a better quality of steel, 40 ft. long instead to 25 to 30 ft., and on lines with many fast trains heavier sections, stronger rail joints, and sleepers about 25 per cent. stronger than formerly. Within the last 10 years 8,058 miles of main track have been wholly renewed at a cost of about $62,000,000. Maintenance of road has cost an average of $806 per mile and $109 per 1,000 engine miles in Prussia, against an average of $731 and $106 on all the German railroads. In the last ten years 2,030 miles of second track have been laid, at a cost of about $16,500,000, bringing up the proportion of double track in the system to 39.3 per cent., in spite of much new road, nearly all single track. Electric block signals from station to station have been introduced on the busiest sections since 1894-95, and $720,000 have already been spent for these; the station block signaling, introduced earlier, has been extended, and now is applied at 64 per cent. of all stations in Prussia, but only to 43 per cent. of all German stations. Interlocking apparatus has been introduced and is now in use at 43 per cent. of the stations, an increase of nearly one-half in five years. Improvements in locomotives have been introduced to make them easier on the track, as well as more effective; cars have been supplied with better couplings and brakes. There are fewer fractures of axles and accidents to tires. Elsewhere we learn that none of the accidents last Summer was due to defects in materials.

The memorial then shows what has been done to make the working force of men efficient. The number engaged in the operating service has increased more than 15,000 since 1894-95, an addition of about 1 per mile of road, which has been made necessary by shortening the hours of work per day and increasing the number of days of rest. This has cost about $1,800,000 per year. At the same time wages have been increased. The average of shop workmen was $204 in 1888 and $259 in 1897; for laborers in the operating service and on the track, $147 in 1888 and $184 in 1897.

The memorial closes by describing a commission which the ministry has appointed to investigate the accidents and to report upon the best method of instructing the operating employes in their duties, of supervising the service at stations and on the road, and recites certain measures already taken, chiefly aiming at a more thorough inspection of the service, the comfort of employes where required to make long waits, and the avoidance of intemperance.

The "Black Prince."

The engraving given herewith shows the four-cylinder compound passenger locomotive for the London & North Western, which was described in the Railroad Gazette of Feb. 18, page 115. This engine, named the "Black Prince," was designed by Mr. Webb and was put into service last August. The engine has two high pressure cylinders outside the frame and connected to the wheels outside, and two low pressure inside the frames and connected to the axle inside. The cylinders are 15 in. and 9½ in. diameter, and the stroke is 24 in. The driving wheels are 85 in. in diameter. The smokebox is divided horizontally and there are two smokestacks, one behind the other. The rear stack exhausts the upper smokebox and the forward one the lower. The weight of the engine is 120,736 lbs., and the weight on the drivers is 76,384 lbs. The heating surface is 1,400 sq. ft., and the grate area, 20.5 sq. ft.



London & North Western Four-Cylinder Compound Passenger Engine.

'Liquid Air."

By Charles J. Bates.

When Dr. Kane returned from the neighborhood of the north pole and told us he had found a temperature of 78 degrees below zero, we thought it pretty cold Such a temperature, however, even if we could hold it so as to test its effects under various conditions, is not low enough to tell us much. Much lower temperatures have been reached, on a small scale, in the laboratory, but not in a form that enabled the experimenter to determine possible effects. It has remained for Mr. Tripler to give us a temperature of something like 300 degrees below zero, and in such quantity, so to speak, that it can be applied to useful and, to say the least, curious experiments showing the effects of intense cold.

Ignoring the presence of small quantities of various gases, and moisture, in the atmosphere, we may say it is composed of a mixture of one-fifth oxygen and four-fifths nitrogen. Without going into details, and in the absence of exact analysis, Mr. Tripler, by the evaporation of two of the parts of nitrogen, secures a temperature that reduces the remainder to a liquid one-third oxygen and two-thirds nitrogen. A number of the effects shown prove the preponderance of the oxygen.

The liquid has the appearance of water with a bluish tinge. When a tumbler was filled, the relative warmth of the glass, compared to the liquid, caused it to boil until about a quarter of it had evaporated, then the remainder would only dissipate as it slowly absorbed the small amount of heat it could get from the surrounding air.

The ordinary effects of intense cold are manifested in what Mr. Tripler calls "a hard boiled egg." He placed an egg in a tumbler and poured his liquid over it, keeping the tumbler full as long as it continued to boil, which was, of course, as long as there was any heat n the egg above the temperature of the liquid. The same was tried with an apple, the result being that they became about as hard as hard wood, at least that is about as good a comparison as I can make, as was shown by placing them on an anvil and striking them with a hammer.

The preponderance of oxygen in the liquid was shown, practically in two ways. A piece of loose felt, heat insulating material, was put into a gas flame to show that it would only burn by being kept there; it was then dipped in the liquid and thrown on the floor, where it was lighted before the liquid could all evaporate, and burned like a magnesium flash-light. A piece of steel clock spring had a match attached to the end of it; on lighting the match and holding it over the evaporating liquid it burned brightly, until the fire reached the steel, which took fire and burned with brilliant scintillations as if in oxygen. A burning object, however, was immediately extinguished as if in water, if dipped into the liquid:

The expansive effects can be readily anticipated and were shown by pouring a small quantity into a cylinder, into the top of which a plug was tightly driven; immediately the plug was blown out with a report like that of firing a gun of the same calibre as the tube.

The physical effect on iron, of this low temperature, could hardly have been anticipated. While most ordinary substances, that are noticeably affected by cold, are rendered brittle by being frozen, we would hardly expect such a tough substance as iron to be affected in this way. The plate iron of which our tinware is made is the best of soft charcoal iron. Mr. Tripler filled a tin (sic) dipper with the liquid, holding it untill all boiling ceased and the metal was as cold as the liquid; then pouring it out he crushed the bowl of the dipper in his hand as if it had been thin glass, showing that the molecular condition of the metal had been entirely changed, but I found it restored on getting warm again by bending a piece of the broken metal in my fingers afterward. Copper, I am told, is not so affected by the cold. It is quite possible that a lower temperature would affect it.

I could not learn that the weight of the liquid had ever been determined; but if we assume it to be about the same as water we can readily calculate that a given amount of the liquid confined and warmed to the temperature of the surrounding air would give us a pressure of 15,000 or 20,000 pounds per square inch, in which case it could be used to advantage in place of gunpowder in large cannon, and would certainly be smokeless.

A recent statement of the number of locomotives and cars on the Prussian State Railroads and their cost shows that the average cost has been $9,957 per locomotive, $2,345 per passenger car, $1,660 per baggage car and $672 per freight car, the latter, be it remembered, four-wheeled cars of 27,500 pounds capacity. These figures may look tempting to our car builders, but we warn them that they must make sure that there are no San Jose scale insects on rolling stock exported to Germany.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

What is semi-steel? That is a question which has a certain fresh interest to railroad men, and particularly to the members of the Master Car Builders' Association, in view of the fact that a movement appears to be on foot to introduce this name into the rules of interchange. It is worth while, therefore, to inquire a little whether or not there is a material lying somewhere in the territory between steel and cast iron which comes so near to being steel that it can be called semi-steel, and can be used for purposes for which steel castings are used. It has recently happened that the scrap heap has revealed specimens of M. C. B. couplers which were obviously enough only fairly good cast iron. Have these been sold as semi-steel? In view of the present interest and importance of this inquiry we print on another page a paper by Mr. Outerbridge, in which he takes the stand at the outset that there is no such material and that the improvement of cast iron by mixing steel scrap with it in melting has been practiced for many years, and that the resulting product will be cast iron and should be sold as, let us say, an improved cast iron, but not under the delusive name of semi-steel.

Some of the members of the Railway Signaling Club are considering the advantages to result should the Club undertake to recommend standards for certain detail parts which enter into the construction of interlocking and signal apparatus. The question is to be brought up at the May meeting of the Club, when it is believed the matter will be put in the hands of a good live committee for investigation and report. The parts that can be standardized to advantage can only be determined after a careful study of the practice of a large number of roads, but there are many small details essentially the same in all installations, which vary in dimensions by only small amounts, but just enough to require carrying a large stock of miscellaneous repair material by railroads and many patterns by the makers. The saving through the use of standards in the motive power and car departments, and the greater facility with which repair work can be carried on, are so apparent that the question of standards has become one of the most important business problems of these departments. There is a very strong argument in favor of an intelligent system of standards in signal work, while this department is still young and before so many signals are installed as to prohibit the adoption of standards, or to limit their use. If some uniformity in the details of interlocking and other signals could be followed in future installations, and standard parts be substituted when replacements are necessary, the cost of maintaining signals could soon be materially reduced. The question is one which concerns not only the men who have charge of the maintenance of signals, but the managing officers and signal makers as well, and it is hoped the matter will be so energetically handled by the Signaling Club and so well presented to the railroads as to meet with general approval.

Ethics of Railroad Management.

We ask particular attention to an article on the Ethics of Railroad Management by Dr. William Taussig, which appears in the Railroad Gazette this week. We do not agree with him in thinking that matters can be bettered by any specific and definite and concerted action toward formulating a code of ethics, either written or unwritten. He is certainly mistaken in saying (in a part of his paper which we do not reprint) that the American Society of Civil Engineers has a code of ethics. He is probably mistaken in saying that the bar associations have such a code. He is probably mistaken also in his estimate of the value of the code of medical associations.

Several efforts have been made to formulate and adopt a code of ethics in the American Society of Civil Engineers, but these efforts have failed, and, as we believe, fortunately. In investigating this subject carefully several years ago, we failed to discover any written code among the bar associations, although such codes may exist in some of the local associations. We discovered also a strong tendency toward simplifying and finally abandoning the written codes of the medical associations.

All of this, however, has nothing whatever to do with the underlying principle of Dr. Taussig's paper or with the real idea that he has in mind of establishing a standard of conduct among railroad officers which shall prevent unprofessional action by bringing to bear a definite and concentrated force of professional opinion. While the engineers and the lawyers do not have formal codes they have very definite standards of conduct, the result of the development among them for years of a high professional spirit. Their code, although unwritten, is powerful. It has taken shape through the written and spoken words of members of those professions and has come to be, while more or less vague and subtle, yet actual and always influential.

In all professions there is a great body of men who will naturally take the high-minded side of any professional question. There is another body of men, probably still greater, who want to do right, but whose standards are at the mercy of the opinion which surrounds them. These are the men who can be influenced by the repetition of such ideas as are embodied in Dr. Taussig's paper. Finally, there is a sediment of men, cynical by nature or of low moral development, or of incomplete intellectual development, who can only be expected to keep within the bounds of the law and who would not be influenced by any code of ethics, written or unwritten, or by any public opinion, decent or indecent, except as such opinion happened to appeal to what seemed to them their own interest at the time. This class, of course, is hopeless, and the only salvation for any profession is to gradually crowd such men out.

We have no doubt that Dr. Taussig is right in his notion that the standard of conduct among men running the railroads of the country has greatly improved in the last decade or two, but among them, as well as among lawyers and engineers, there is still plenty of room for improvement in professional ethics. Those who have read Macaulay's essay on Lord Bacon (and who has not?) may perhaps remember his scorching criticism of the sophistry by which lawyers justified themselves in his day, as they do now, for attempting to defend the criminal and to defeat justice. "We will not at present inquire whether it be right that a man should, with a wig on his head and a band round his neck, do for a guinea what, without those appendages, he would consider it wicked and infamous to do for an empire."

A Demonstration in the Use of Heavy Cars.

As a freight carrier the Pittsburgh, Bessemer & Lake Erie is in a position quite unique when we consider the geography, the traffic to be handled, the road and the equipment. This road carries coal to the Great Lakes and ore back to the furnaces at Pittsburgh. Its traffic is mostly through. We have no statement of the percentages of through and local freight, but essentially the road is worked as a carrier of through freight. Its cars can be loaded up to capacity and need not move until they are loaded, and only full trainloads need be hauled. The cars, with a capacity for 50 tons of ore, are loaded to 50 tons, and we judge sometimes more. Probably their capacity in volume will not allow them to be loaded with 50 tons of coal, but of course they carry unusually heavy loads of coal back to the lake.

The grades are being reduced to a maximum of twenty-nine feet in the direction in which the ore moves, but the road will be worked on the basis of an 18-ft. grade by using assistant engines. The entire main line is now, we suppose, laid with 100-lb. rails, at least when we last received information on this point it was expected that this work would be completed considerably before this date. Two extensive yards, with an aggregate of 20 miles of track, are in a more or less forward state of construction, as are 10 miles of passing sidings. Thus the road is in shape to move its traffic with expedition.

The road has, as every reader knows, a considerable equipment of steel cars of 100,000 lbs. capacity, and its standard locomotives are powerful. The moguls bought last year have 130,000 lbs. on the drivers, 20x26-in. cylinders; 72-in. boiler carrying 180 lbs, and 2,033.7 sq. ft. of heating surface.

The conditions are ideal for realizing in practice the theoretical advantages of cars of great carrying capacity. In working out the scheme of equipment to gain these advantages, the management has had a free hand and has gone beyond anything in that way that has yet been done in the country. It is still too early for a complete demonstration of the advantages of the modern equipment, but we have a few figures that are important.

In actual practice trains of 30 steel cars are hauled. The cars weigh 540 net tons, and carry 1,500 net tons, or 1,340 gross tons. The paying load is 73½ per cent. of the total trainload, and the train mile earnings are actually $5.38, at a rate of 3½ mills per ton per mile, which indicates that the load of 1,500 tons of paying freight must sometimes be exceeded. It would be interesting to compare these train mile earnings with actual earnings by trains carrying high class freight at, say, three times the rate here received for carrying ore, but, after all, such figures would be rather curious than useful, because high class merchandise freight could hardly ever be carried in full maximum trainloads. A better comparison would be with through grain traffic from the lakes to the Atlantic. Here it is practicable to carry a paying trainload sufficient to earn (on the agreed rates) even more per train mile than is earned by the steel cars carrying ore from Lake Erie to Pittsburgh, but in case of the grain train the profit is probably less, inasmuch as the percentage of paying load would be a good deal less.

It is interesting, but perhaps not very relevant, to observe some of the average rates and earnings on a number of the railroads of the country, as taken from the annual reports. Of course these are averages and have but little to do with the case, but they make suggestive comparisons. As we have said, the Pittsburgh, Bessemer & Lake Erie can earn $5.38 a train mile on a rate of 3½ mills. The average rate of the New York Central in a recent year was 6.8 mills, and the train-mile earnings, $1.84. The average freight train load was 270 tons. The Erie has a still lower average rate, namely, 5.84 mills, and its freight train earnings are $1.47. The Chesapeake & Ohio has one of the lowest average rates, perhaps the lowest of any railroad of its mileage, namely, 4.26 mills, and its average freight train earnings are $1.38. The Southern had a high average rate, namely, 9.26 mills, but, nevertheless, its train mile earnings were almost identical with those of the Chesapeake & Ohio, namely, $1.38½. In the Middle West we find the Wabash with a rate of 6.61 mills and an average train mile earning of $1.41. Of course when we get up into the far Northwest, with a traffic relatively very thin and hauls very long, we must find higher rates and earnings. The Great Northern, for instance, had an average rate of 9.56 mills and train mile earnings of $2.73, and the Northern Pacific a rate of 11.4 mills and earnings of $2.10.

It will be very instructive to discover what the average rates and train mile earnings on the P., B. & L. E. will prove to be after, say, half a year or a year of normal working. Doubtless the average ton mile rate will be much closer to the minimum and the average train mile earnings closer to the maximum than on almost any other railroad that we could find, for reasons indicated above.

The Supreme Court on the Nebraska Freight Rate Law.

It is reported that the Attorney-General of Nebraska is trying to get the United States Supreme Court to modify its decision in which it nullified

the Newberry freight-rate law.* To the lay mind his application to have the railroad officers released from the injunction seems reasonable enough, and he will probably succeed in his endeavor, but it is difficult to see wherein he will be any better off than he was before, unless the plan is to "bluff" the railroads; to get them to make a reduction themselves, in order to stave off action by the State. To take any legal action the State will have to pass a new law, and that will necessitate calling together the Legislature.

As we concluded from the first press reports (Railroad Gazette, March 18, p. 200) there is an apparent and probably, a real inconsistency in the Supreme Court's decision, in that it holds the law unconstitutional while yet giving the defeated plaintiff leave, contingent upon future circumstances, to apply for a further order hereafter; but we cannot see that this will help the present Nebraska State officers in their attempts to reduce railroad rates. A perusal of the full decision shows that Justice Harlan did not explicitly say in his summing up that the Newberry law was null and void; and it is possible that, whenever the changes of time shall have made the Newberry rates reasonable, the Court may hold the law valid (though the formal declaration of the lower court, that "the act is repugnant to the Constitution of the United States," is approved); but this affords no comfort to the Nebraska rate reducers, for the Act specifies every rate in inflexible figures. It made very severe reductions (29.5 per cent., it is said), The Nebraska State Board, recognizing that they are defeated in the attempt to make that reduction, are now ready to compromise; to make a reduction of, say, 10 per cent. But the Act is in such rigid terms that it admits of no compromise. The reduction must be at least as much as the Act says, or nothing at all. The Court has indeed left the State a little ray of hope, but the chances of being able to take advantage of it are about as good as are those of seeing the next eclipse of the sun; for this it will be necessary to go to Patagonia to get standing room, and the day may be cloudy, after all; and for the chance to revive the Newberry law it may be necessary to wait until the Populists are all dead. If our Western friends had not allowed their greed to so completely consume their judgment and had left to the State Board of Transportation some discretion in fixing rates, they might now be "striking" the railroads for a glorious compromise.

The most radical criticisms of the Supreme Court's decision are those based on the claim that Legislatures are always above the Courts. "When," says one critic, "in a government of co-ordinate departments, did a court get the right to say of the act of the Legislature that it was not 'due process of law'?" On this point Justice Harlan says:

> No one, we take it, will contend that a State enactment is in harmony with the supreme law of the land simply because the Legislature of the State has declared such to be the case; for that would make the State Legislature the final judge of the validity of its enactment, although the Constitution of the United States and the laws made in pursuance thereof are the supreme law of the land, anything in the constitution or laws of any State to the contrary notwithstanding. Art. VI. The idea that any legislature, State or Federal, can conclusively determine for the people and for the courts that what it enacts in the form of law, or what it authorizes its agents to do, is consistent with the fundamental law, is in opposition to the theory of our institutions. The duty rests upon all courts, Federal and State, when their jurisdiction is properly invoked, to see to it that no right secured by the supreme law of the land is impaired or destroyed by legislation. This function and duty of the judiciary distinguishes the American system from all other systems of government. The perpetuity of our institutions and the liberty which is enjoyed under them depend, in no small degree, upon the power given the judiciary to declare null and void all legislation that is clearly repugnant to the supreme law of the land.

This does not meet the objection that the Supreme Court is in this case deciding what are the facts, rather than laying down principles of law; but what, in the last analysis, is judicial law-giving at the present day but the deciding (by an educated jury of nine instead of by an ignorant jury of twelve, or by a Legislature of a hundred) of questions of fact as illuminated by well-settled principles? And it is to be remarked that the Supreme Court had in this case a very easy task. If the law had made only a moderate reduction of rates proof of probable loss to the railroads would have been hard to demonstrate and the lawyers might have split hairs for years without making out a case.

The criticism that the courts in making freight rates, are meddling with administrative details, seems hardly fair. The American Monthly Review of Reviews puts it in this way:

> "Under existing circumstances it is probable that the courts have taken a sound and a necessary position. But surely it is not a position of stable equilibrium. Under the same principle the courts must undertake the regulation of the practical business of street-railroad plants, gas companies, and all other enterprises of a quasi-public nature. There seems to be a fallacy somewhere in this position. It is certainly the business of the courts to say whether or not a law regulating railroad rates is valid and constitutional. But it does not seem to be the proper business of a court of law virtually to make and apply the regulations in detail. The opinion of a judge as to what is reasonable in a matter of that kind is not likely to be as good as the opinion of an expert body like the Interstate Commerce Commission."

We leave it to the courts to answer the charge of fallicious reasoning, but we would remind our contemporary that Justice Harlan will never get within forty miles of the details of rate making as long as he has nothing more practical to work upon than this law of Nebraska. He seems to have decided this case because, in the language of the street, it was "dead easy." If the existing and the proposed tariffs had been near enough to the same basis to make it at all doubtful which was the most nearly right and just, there can be little doubt that he would have found a way to let the question be decided by some "expert body"; though from the past decisions of the Federal Courts it seems doubtful whether either the Nebraska Board of Transportation or the Interstate Commerce Commission would have been chosen for such a duty.

The most troublesome fallacy before us, from a practical standpoint, is not that which arises from the boldness of the Supreme Court in ruthlessly demolishing the Nebraska Legislature's assertion that the Newberry rates are "reasonable," but rather than that found in the reasoning of the legislators which led them to pass such an inflexible law. The Act was of a piece with the edicts of 300 years ago fixing the price of bread. It is true that laws equally fallacious in principle are passed every year, but they generally defeat themselves and so do not reach the Supreme Court.

It does not impair the force of Justice Harlan's decision that he uses some arguments based on the percentage of (all) expenses to (total) earnings, and adopts a very crude estimate of what this percentage is; he subsequently presents the unanswerable argument of the actual earnings for three years, which would be a sufficient reason for every practical critic. Again, it may be said that in considering the question of dividing burdens between interstate and intrastate traffic Justice Harlan evaded a difficult question, but this objection, with the others, is swallowed up by the very radical terms of the Newberry law. The decision says:

> "It must be held that the reasonableness or unreasonableness of rates prescribed by a State for the transportation of persons and property wholly within its limits must be determined without reference to the interstate business done by the carrier, or to the profits derived from it. The State cannot justify unreasonably low rates for domestic transportation, considered alone, upon the ground that the carrier is earning large profits on its interstate business, over which, so far as rates are concerned, the State has no control. Nor can the carrier justify unreasonably high rates on domestic business upon the ground that it will be able only in that way to meet losses on its interstate business. So far as rates of transportation are concerned, domestic business should not be made to bear the losses on interstate business, nor the latter the losses on domestic business. It is only rates for the transportation of persons and property between points within the State that the State can prescribe; and when it undertakes to prescribe rates not to be exceeded by the carrier, it must do so with reference exclusively to what is just and reasonable, as between the carrier and the public, in respect of domestic business."

To practically settle the question of rate-making here dealt with, might be impossible; but the Court's position is sound, for it is dealing not with actual rates, but with State-prescribed limits for rates. The fair inference is that such limits ought to leave room for necessary adjustments.

The only practical criticism of Justice Harlan that we have seen is the suggestion that lower rates would increase business, the action of the Government of Hungary being cited. To this it may be answered that Hungary owned her railroads, while Nebraska does not; and that the fares in that country had been the highest in Europe. Again, radical reductions in passenger rates are much easier to deal with and less likely to work disaster to the railroad than like changes in freight rates. The manager of a State railroad can make radical reductions of rates and depend upon political arguments to justify possible unfavorable results; but a manager who has to pay interest on bonds and stock makes reductions more gradually, however fair the promise of profit thereby.

*See "Railroad Gazette" March 11, p. 177. Press dispatches from Lincoln say that the Attorney-General's application has to do with a clause in the decree entered by Judge Dundy in the Lower Court to the effect that "the said railroad companies and each and every one of them . . . be perpetually enjoined and restrained from making or publishing a schedule of rates for the transportation of freight, in this State, whereby such rates shall be reduced to those prescribed by "House Roll 33," and below those now charged by said companies. . . ." The Supreme Court's decision affirmed this decree without qualification. Attorney-General Smyth believes that the clause forbidding the railroads to reduce rates below those in force at the time the decree was issued (1893) was overlooked by the Supreme Court. The reporters believe that this clause was smuggled into the decree by the attorneys for the railroads.

Mr. Cullom's bill* to amend the Interstate Commerce law, which is now before the Senate (S. 3354, Jan. 22, 1898), is being subjected to considerable public discussion, and it is clear that it will not be allowed to pass without sharp challenging of many of its features. It certainly needs amendment in important particulars if it is to conform to the views of the more conservative business interests of the country. Mr. Hines, attorney for the Louisville & Nashville, appeared before the committee at Washington last week and argued strenuously against not only particular details of the bill, but against the constitutionality of one of its main purposes, the purpose to confer upon the Commission rate-making powers. It is unjust, said Mr. Hines, in three principal particulars: It gives effect to the orders of the Commission without judicial decision; it proposes to change the law as it applies to long and short hauls, and it proposes to give the Commission power to fix rates, to change classifications, and to prescribe rules for the regulation of the interstate commerce of the country. He took the position that such orders as it was proposed to give the Commission power to make in the matter of the regulation of rates would be an improper delegation of power, even if constitutional. A press dispatch from Chicago says that the railroad men there are raising a hue and cry over the bill, their arguments being the same as Mr. Hines'. Some Chicago railroad men, however, hold, with Mr. Depew, that it would be a good thing if the power to make rates were delegated to the Commissioners, as it is certain that they could not do worse by the stockholders than the present traffic officials are doing; and there might be some prospect of stability of rates. The New York Chamber of Commerce has unanimously adopted resolutions deprecating increasing the power of the Commission, and declaring that the bill should be amended so as to eliminate all power to fix rates. The Chamber holds that "the history of railroad regulation proves, as illustrated in Massachusetts, New York and other states, that publicity and advisory powers are the wisest; and we recommend prudence and caution in dealing with the great questions involved in the interstate commerce of a nation of seventy millions of people."

So much for New York and the railroad interest. The other side was presented to the Senate committee by Chairman Knapp of the Commission. He said the situation had resolved itself into this—that the present law, crude and ineffective in some respects, has practically been broken down. The proposed bill is to provide new machinery by which the principles of the original law may be made effective. Unless these cardinal principles are maintained, Judge Knapp thought it would be better to take away the power the Interstate Commerce Commission is supposed to have. He said, however, that in 225 formal proceedings of persons aggrieved in not a single instance did the railroads set up a want of authority on the part of the Commission. Section 4 of the present law had been seriously crippled in its operation by the decisions of the courts. The proposed substitute for that section, he declared, is practically the British law, and has received the approval of the Commission after the most careful thought. The existing law is faulty in not requiring the railroads absolutely to publish all tariffs, local and foreign. The bill corrects this. The provision requiring 60 days' notice of all changes in tariffs is also important and necessary. These points from Mr. Knapp's argument we take from the report in the New York Times. Those who oppose the bill will do well to note them, for they are not by any means weak. Many of the features of the bill are commendable, whatever may be the main theory of the Commission's functions. But, as shown by the debates in Congress in 1884-86, referred to in the Chamber of Commerce resolution mentioned in the preceding paragraph, the statement that Mr. Cullom's bill (drafted, we suppose, by Mr. Knapp) simply gives effect to principles already embodied in the law, is open to question. One principle, pervading the whole of the original law, was that the Commission was simply an investigating and recommending body; the amendments now proposed come pretty near making it a law-making body. The bill has numerous ingenious provisos designed to cushion the hard spots. But its general tendency seems to be to put upon the railroads the burden of proving the injustice of any order that the Commission may see fit to make. If this is so, even in a small degree, it at once brings up the question, which we have repeatedly urged before, of the composition of the Commission. If the Commissioners are to be deemed as good judges of transportation questions as are an equal number of experienced railroad officers, the railroad interests of the country may at

*A summary of the Cullom bill will be found on page 275.

least demand that the board shall be made up on some basis different from that which now prevails, and this demand involves not the slightest discourtesy to any five lawyers, however eminent.

NEW PUBLICATIONS.

Mechanical Traction on Tramways.—A study of different systems. By Raymond Godfernaux, of the Northern Railroad of France, etc. Large octavo, 372 pages, 182 engravings, no index. Paris: Baudry & Co., 1898. Price 20 francs.*

There are few subjects of livelier interest than that which Mr. Godfernaux has taken up, and when we opened his book and saw that he proposed to tell us about the whole range of apparatus and methods for mechanical traction on street railroads we felt that at last the book had come for which this generation is waiting. But a brief examination has disappointed us. The study is narrow; it is largely theoretical and it is not up to date. The book will be useful to many people, partly as some record of what has been done and partly for its suggestions. But it is not conclusive or authoritative in any respect.

The author takes up first the class of street railroad motors in which the energy is produced directly on the vehicle, and here he considers the Rowan motor and the Serpollet. Naturally, the Rowan motor need occupy but little space. It has been 22 years before engineers, has had considerable trial and has taken no important place. It is now in service in Stockholm, Copenhagen, Berlin, Moscow and in two or three French cities, but everywhere on only quite a moderate scale of use and performance. It is an effort to adapt the steam locomotive with a special boiler to street railroad work.

The Serpollet system, which was first applied in Paris in 1893, is another effort to carry out this same idea. It is now in use either as adopted or experimentally in ten or a dozen cities in various parts of the world and is still under experiment and investigation with some prospect of considerable use. The original feature of this motor is in the boiler. It is a multitubular boiler designed to be extremely compact. The tubes are peculiar in form and in disposition.

The author takes up next the class of motors where the energy is taken from a central station and stored on the motor, and under this head considers the system of Lamm and Francq, which is for hot water storage. A good many applications of this motor have been made in France in recent years. It is found on several Parisian tramways and in various other French cities, but we find no mention of it outside of France, except on a little railroad in Batavia. This is the only motor of this type which is described, but it is described in considerable detail and with analysis of service and efficiency.

The next topic taken up is compressed air motors. Here the author considers the system of Mékarski, brought out in 1872, which is described with some particularity. There is a discussion of the theory of the use of compressed air which might perhaps have been omitted and the space better used by descriptions of actual installations and experiments. The recent attempts to use compressed air as a railroad motor in the United States are not mentioned. Nevertheless, this chapter will be useful to the students of the subject.

The use of storage batteries for this work gives a more or less general account of forms of batteries and of their efficiency, and here also the general and theoretical study occupies space which might well have been given to specific examples. A description is given of the installation of 1893 from Paris to Saint-Denis, which description is pretty thorough, as is that of two lines, one of 6.9 kilometers and another of 5.3 kilometers, and still another of 4.9 kilometers worked from the Madelaine in Paris out to different points.

Certain installations for working street railroads by gas motors are also described, but this chapter is extremely brief.

The next great division of the subject is tramways where the energy is taken from a central station and distributed to the motors as used. Naturally, this includes cable roads and what we know in this country as trolley roads, covering, of course, underground conductors. This is the longest single chapter in the book, occupying about 160 pages. This whole chapter would seem quite elemeniary to the American reader. Obviously, on this side of the water this art has advanced immensely beyond anything that is known in Europe.

The book closes with an attempt at a comparison of the different systems as to advantages and disadvantages, but the comparison is too brief and superficial to be of much value.

American Railway Bridges and Buildings. Being the official reports to the Association of Railway Superintendents of Bridges and Buildings. Compiled and edited by Walter G. Berg, Principal Assistant Engineer Lehigh Valley Railroad, and President of the Association of Railway Superintendents of Bridges and Buildings. Chicago: The Roadmaster and Foreman, 1898. Octavo, 706 pages, with index and numerous illustrations.

The annual reports of the Association of Railway Superintendent of Bridges and Buildings have been issued regularly, but only in limited numbers and in sheets and pamphlets difficult to preserve and use. Mr. Berg, whose industry seems to be unlimited, has compiled and edited these reports, covering a period of seven years, and the results are published in the volume before us. In the nature of things the numerous topics that are considered must be scattered through the pages and treated with more or less thoroughness, or want of thoroughness, in various places, inasmuch as they are found in the reports submitted from time to time and are considered in abstracts of the discussions which took place at the meetings. An index by chapters and an alphabetical index, however, enable one to easily find and collect the information concerning any particular subject which he wishes to look up.

The topics cover almost everything in the way of track structures, excepting the track itself. Bridges, for instance, are considered as to painting, fire protection, design of frame and pile trestles, creeping of rails, guard rails, elevating curves, duties of a superintendent, inspection, effects of high speed, etc. It would be superfluous to go into further particulars as to the separate topics that are treated of at more or less length. The reader is already pretty familiar with the scope of the work of this association and a great many men will be indebted to Mr. Berg for bringing the documents together in shape for preservation and ready reference.

A Directory of Directors in the City of New York. New York: The Audit Company, 120 Broadway, 1898. Octavo, 600 pages.

This is a solid looking book, consisting of an alphabetical list of names, and under each is the name of the company or companies in which each of these gentlemen is a director. There is absolutely not another word of information in the volume, and therefore we cannot tell what limits were set on the list or by what rules it was made up. The New York City address of each director is given, but, obviously, every man in New York who is a director in something cannot be named. Presumably, however, the line has been drawn so as to include men who have some responsibility and companies of comparative importance.

We discover in a hasty examination that Mr. C. H. Coster, of the house of J. P. Morgan & Co., is a director in 59 companies. Mr. Depew follows him closely, being a director in 58 companies. It is rather too bad that he was not informed of Mr. Coster's record, in order that he might have had an opportunity to add two more directorates to his list. Mr. Cornelius Vanderbilt is a director in only 54 companies. These, so far as we have discovered, represent the highest powers to which any one director has been raised in this list.

History of the Great Northern Railway (England), 1845 to 1895. By Charles H. Grinling. Octavo, 430 pages, numerous illustrations and index. London: Methuen & Co., 36 Essex St., W. C., 1898. Price, 10s. 6d.

If any one wants a very detailed history of the Great Northern Railway Co. from its beginning to the year 1895, here it is. Mr. Grinling has certain peculiar qualifications for the work in that his father, Mr. William Grinling, served the company for over forty years and his brother, Mr. W. H. Grinling, has long been in the service, and the author of this book has for years been in close contact with many of the officers of the company. He gives a very minute and particular story of the parliamentary and business history of the company. He gives also many details of the physical history, as to the development of engineering structures, permanent way, rolling stock, signaling, etc. The book is much too detailed to hold the interest of the general reader, or at least of the American reader, but it has permanent value as a history and it is unfortunate that similar histories cannot be written of the great individual railroad companies and systems on both sides of the water.

Foreign Railroad Notes.

The Austrian railroads in 1895 had 151,872 employes on their 10,244 miles of road, which is nearly one-fifth as many as were employed in this country on 180,000 miles. The average number per mile worked was 4.41 here and 14.82 in Austria. The amount of work done per employe was 16.047 passenger miles and 38,720 ton miles in Austria, against 15,550 passenger miles and 108,720 ton miles in this country. The average pay of the Austrian railroad men was not quite $250. Of the whole number 1,253 were women. Salaries and wages were 54 per cent. of the total working expenses.

The Austrian State Railroads have a zone tariff, heretofore described, which makes it easy to record the number of journeys from different distances. In 1896 56¼ per cent. of them were in the first two zones, 12 miles or less; 34 per cent. in the next four zones, from 13 to 50 miles; 8½ in the six zones from 50 to 124 miles, and only 3¼ per cent. in the greater distances of the other 18 zones, extending up to 683 miles. Passengers on express trains pay one-half more than on ordinary trains, and the result is that less than 4 per cent. of the whole number traveled by express.

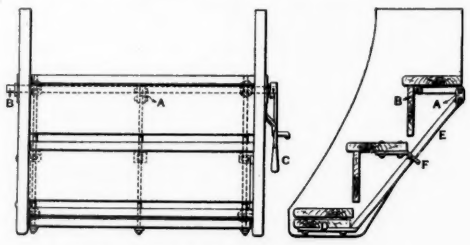
On the Prussian State Railroads (about 17,000 miles) their last fiscal year the number of sleeping car passengers was 109,777, and the income from them $184,177. There were 60 sleeping cars, running over 14 different routes, besides four routes worked by the International Sleeping Car Company.

The Austrian State Railroads have discovered the railroad velocipede, and its track, bridge and telegraph inspectors are trying it.

A Gravity Extension Passenger-Car Step.

A gravity extension coach step which appears to have met with the approval of those who have tried it is being put on the market by Messrs. Taylor, Farrell & Quebe, Houston, Tex. By the use of this step the necessity of having a stepping box at low station platforms is avoided.

It will be seen from the illustrations that this extra step, when not in use, is drawn up out of the way under the lower fixed step. The extension step is held by two rods, working in suitable guides, and is raised by means of the toggle joint A and rock shaft B; the shaft being operated by the lever C at the side of the steps. The extension step is held in its upper position by a spring catch which engages the operating lever; and when the catch is



Gravity Extension Passenger-Car Step.

released, the weight of the extension step carries it to the lower position. While the design of some of the minor details as shown in our drawings might be improved, yet the device in principle is quite simple and permits of ready change to fit special conditions.

We are informed that this step has been in use on the trains of the Gulf, Colorado & Santa Fe, between St. Louis and Galveston, for about two years and that this road has recently adopted it as standard for all passenger cars. Similar steps are also in use on several private cars of other Western roads.

The Relation of the Strength of Wood Under Compression to the Transverse Strength.*

About eight years ago a comprehensive study of American timbers was begun in the United States Division of Forestry. . . . So far, the insufficient appropriations and facilities at our disposal have permitted us to establish really reliable standards for five species of Southern conifers only. These have been deduced from nearly 20,000 tests. Besides these, 10,000 other tests have furnished indications regarding some two dozen other species. This work is now entirely abandoned, waiting for more prosperous times.

The study of wood in general, however, can be carried on with smaller means, and has this year yielded highly important results, which will soon be published in detail. It is the purpose of this paper to make to the Institute the first announcement of a few of these results, and especially of one—a discovery which will place the engineer in a better position than he has ever yet occupied in the designing of wooden structures. . . .

The important discovery is that there is a direct relation between the strength in end-wise compression and in cross-bending; in other words, that the transverse strength of a beam can be directly computed from its compression strength.

The credit for this discovery, and for the development of the formula expressing it, belongs to a young engineer, Mr. S. T. Neely, who was charged with the duty of compiling our test data for use. . . .

1. It is established by theory and by extensive experiments that, in a beam loaded in the middle, the distortions are not only proportional to the load, but are equal on the compression side and the tension side of the neutral plane until the elastic limit has been reached.

2. From the study of strain-diagrams and data of several thousand tests it appears that the elastic limit of a beam has been reached when the extreme fiber-stress becomes equal to the compression strength of the material; in other words:

3. The cross-bending strength at the elastic limit is practically equal to the compression strength at fail-

*La Traction Mécanique des Tramways. Etude des Differents Systemes; Comparaison et Prix de Revient. Par Raymond Godfernaux, Ingenieur des Arts et Manufactures Attaché à l'Exploitation du Chemin de fer du Nord et à la Direction de Diverses Compagnies de Chemins de fer d'Interet Local.

*From a paper by Mr. B. E. Fernow, Chief of the Division of Forestry, read at the Atlantic City Meeting of the American Institute of Mining Engineers.

ure, and we need only determine the latter to have at once a safe basis for the designing of wooden beams.

This is the practical result: That the necessity for tests is reduced to a minimum, and no doubtful formula need be introduced in utilizing the test data. Since no beam should be designed to be strained beyond its elastic limit, nothing but the compression-strength needs to be known for practical purposes.

Nevertheless, Mr. Neely has followed up the further behavior of the beam to rupture, has developed methods of determining the position of the neutral plane at any time until rupture, and has also shown how to calculate from a compression-test the beam-strength at rupture.

Other important results and deductions from these series of tests may be stated as follows:

1. Wood-testing should be done preferably on green or soaked timber, thus eliminating the variable influence of moisture on strength, which begins to assert itself when the moisture is below 32 per cent.

2. A well-planned series on small laboratory-sizes furnishes more reliable standard and average values for practical use than tests on large beams and columns. This conclusion is the result of some 60 tests on large beams, and over 100 tests on large columns, compared with over 1,000 tests on small pieces cut from them.

3. The best size for compression-pieces to furnish the most uniform results is a cube of 2 or 3 in.

4. A difference of 10 per cent. in compression-strength values for conifers, and of 20 per cent. in hardwoods, cannot be considered as a valid difference for practical purposes, being chargeable to the natural variability of the material.

5. Wood compressed across the grain increases in strength comparatively, and does not lose its strength in endwise-compression, pieces compressed to 50 per cent. of their original height exhibiting as much compression endwise-strength as uninjured ones.

The Claim Agent'.

Most managers and superintendents consider the claim agent a nuisance; necessary, perhaps, but still a nuisance. The settlement of claims for loss and damage to freight is properly a function of operation, and as such would appertain to the superintendent's office as a sub-department. A good claim agent has to be as diplomatic as a prime minister. He needs to be keen, yet he has, upon some points, to appear as obtuse as if he had been born without perception. He can't be long in office, if at all fitted for it, before he develops many of the characteristics of a good criminal lawyer, and yet he should try to have it generally believed that he is always ready to go more than half-way to meet an offer of compromise. . . . The claim agent has to be fairly well posted as to pretty nearly every department of the service. He has to know about rates, a function of the general freight office. He has to know about the movement of trains, meeting points, junctions, even of the changes of engines and of train crews. He has to know how goods are received and loaded at one and another station, and why there is a difference in methods between stations of his own road in many details. He has to know how exchanges of cars and freight, billing, etc., are effected between his own and connecting lines' stations; has to keep in mind that some of his road's connections have receiving tracks in the yards of his company and come to those yards for cars, while in other cases his people move cars into the yards of the other road and there make deliveries. If you have any doubt about this, try for awhile to keep tab on the questions which arise about "seals," "delivery," "where responsibility begins," etc.

If he have some knowledge of the construction and nomenclature of parts of cars it is of value to him. Of course, I don't mean that he should merely know the difference between a box car and a flat. There are some "flats," though, in the business who do not know a bolster from a buffer, nor the difference between a door-cap and a transom. The value to him of such information appears when he has a claim urged against his road because of an exception made by some joint car inspector at a junction point, where the bad order reported may, from its character, be known by him to have nothing whatever to do with the cause of the claim. He has to study geography, history, grammar and law. What would you say to a case where shipment, billed "Charges guaranteed," was refused, and the agent at destination had "humped himself" to obtain a purchaser, because the goods were perishable and he could get no word from the guarantor, who came upon the scene later with a lawsuit, because, as he said, it was his business to take care of the charges, and the claim agent might have allowed the stuff to stand there and rot, but should have kept his hands off, looking to him for his freight money.

I mentioned geography. I have found myself puzzled to know why a car of pig iron, originating up in Wisconsin, should come into St. Louis from a road doing business in the iron fields of Alabama, and not long ago I was asked to help take care of a deficit upon the sale of watermelons, shown by the papers to have originated in Georgia or Alabama, to have come to St. Louis, gone to Kansas City, thence to Sioux City, Iowa, from there to St. Paul, winding up the journey somewhere in Wisconsin. Those melons had traveled to all points of the compass, and after allowing for the deficit, what we had for our share was hardly worth mentioning, but I had studied considerable geography. I won't enlarge upon the need for knowledge of grammar and history, but I could if desired.

. . . Years ago a claim agent sent me a bill for a fireplace grate, value 65 cents, said by his agent to have been all right when loaded, but checked by our man as broken when taken from the car. A natural adjustment would have been for each to pay half, but the other man would not agree, and referred the matter to his President. He took it up with mine, who said he had no time to waste on so trivial a matter, to adjust it in any manner deemed proper. Well, that other President wrote that he had taken his chief engineer, that they had measured the distance to the Relay and to our yards in St. Louis; that their haul was so many feet and ours so many; that the relative percentages were so and so, which would make their road's proportion 19.3 cents, or so small that we should pay the whole amount. So far, good. But, pending this, I got another, similar in one thing—that there was a breakage. This was a marbleized slate mantelpiece, given us to be taken to the Missouri Pacific, which road's agent at Seventh street checked the article as broken when found in the car, adding that the damage was due to setting the mantelpiece on end in the car, but unsecured, so that it toppled to the floor and was broken in transit. I sent papers back, asking if the claim agent would pay for damage because of the faulty loading, or did his President think this should be adjusted on mileage, and would he have the percentages, including those of the Missouri Pacific, figured out. Papers were returned to me advising that the President said this claim should be adjusted upon earnings. Well, I sent it back, asking that he have his President kindly explain how we were to arrive at the earnings of the Pacific for switching the car into its warehouse and before the goods were billed. Before the papers again reached me I got another claim, identical with the last except that the car went down to the Iron Mountain warehouse via Poplar street. I sent the papers right back and asked if he'd get his President to tackle this, saying whether it should be mileage, and how much, earnings, and how much, or why he should not pay it all for his bad loading. He threw up his hands and declared that this should be divided equally, each of the four roads handling to pay one-fourth. Are you surprised that I wrote to Mr. Claim Agent that his President might be in a business he knew more about and was better qualified for than the settlement of 65-cent damage claims? He certainly wasn't a good claim man, and I may remark that he isn't in the president business any more, either.

Claims arising from the unaccountable disappearance of goods serve as tests of skill in investigation. The dishonest employee is the hardest to trace. One of his methods is to "sneak" a package after it has been loaded and before the sealing of the car. Another is the manipulation of the seals themselves. Occasionally dishonest employees of those making the shipments abstract goods in much the same way, placing empty cartons or packages in the cases packed.

Damage claims are legion. A man with melons wants a stock car for the reason that it is slatted; then he kicks because they turn out short or some are cut between the slats, or he didn't get a good move on the car. Or it is hogs he has, and the time is slow and they miss a market, or too fast and some go to everlasting smash; or it is cows, and they shrink so in milk that he has to accept scalawag beef prices; or horses, and they got bunged up; there is always something to base a claim on.

The claim agent should know the little intricacies of billing, both for the adjustment of overcharges and as to details which pertain to the movement of the car, its routing, etc. A claim is often determined from the insertion or omission of a word or a letter; from the omission of the point of junction or some apparently trivial matter, and his intimacy with such minutiae may go far toward establishing his efficiency or the reverse, and his corresponding value to the management. An observation of conditions developed in the investigation of cases may show dereliction of duty on the part of those charged with the inspection of cars, attending to their security, or to recording evidence that such security is not in any way impaired while the property is in his company's possession; conditions not suspected and so uncorrected until by him called to the attention of the proper department.

Until it is fully established that he is thoroughly competent to suggest and advise in these varied matters, the claim agent should "go slow." He cannot be too careful of encroachment on the duties of other departments. He must not step into the Auditor's and instruct an agent to change his methods of billing or of making report, nor into the Manager's or the Superintendent's and say that the loading isn't done as it should be, or that the tallies or checking are not worth swearing at, to say nothing of swearing by, nor that the watchmen or seal-takers shall exercise more diligence, and not merely catch seal markings upon one side of a string of cars, noting the other side ditto. He must ask the head of such department to see to the change which seems desirable.

The Claim Agent's relations with other roads generally are pleasant, but they sometimes become strained. Each of the gentlemen with whom he corresponds uses all the shrewdness he can command to make the "other fellow's road" appear to be the one with which the fault lies. Disputes as to facts are common, and rules to govern those who may be said to agree to disagree have been formulated, assisting materially in adjustments. Indeed, if they can arrive at an agreement as to facts there is little difficulty in determining liability of the one or the other. Much of the trouble between claim agents in the shape of disagreements grows out of the misrepresentations or lack of knowledge of their subordinates or of those upon whom they have to depend for information. There are men who think they are doing a good thing for their company by a showing which appears to put their station in a good light, though they do not always look far enough ahead to see where they will fetch up. A certain agent, a good friend of mine, showed a car as passed to my company "Sealed both sides, end doors securely fastened." I thought it odd that an engine and boiler should be in a box car, so I looked in an old Equipment Guide which I keep for emergencies, and all that I wrote back was: "Please have Mr. Blank explain how he attached the seals to a coal car." Most claim agents would far rather have the facts than be misled upon a mere chance of avoiding payment. Sometimes, in the long drawnout correspondence regarding seals, their markings, removals and changes, the real cause of the claim is lost sight of. I had recently a great bundle of papers sent me. I had not seen them before, and found that they disclosed any amount of investigation of a seal record. I was asked to pay $15 because the connecting line's agent said that when they got the car from us one seal was defaced. Yet there was not a shortage, the claim being for damage to a lot of 300 sacks of oil meal, checked at destination, down in Maine, as "This car full of Western mice and 250 sacks more or less damaged from being eaten by mice." I told that other fellow that I stood ready to show that we hadn't any such mice in stock, hadn't loaded any such mice, nor had any been loaded into the car while we had it, that I didn't know any difference between Western and Eastern mice, and that if we had known there was any live stock or packing house product in the car when it came to us we would have charged accordingly and not at fertilizer rates. . . .

* From a paper by S. D. Webster, Freight Claim Agent of the Terminal Railway Association, read before the St. Louis Railway Club, March 11, 1898.

TECHNICAL.

Manufacturing and Business.

Chas. A. Boyd has resigned the position of Superintendent of the Walker Company of Cleveland, to take effect April 12. He will engage in business for himself, doing general engineering, with offices in the American Trust Building, Cleveland, O. Mr. Boyd has been with the Walker Company for the past four years, having started as engineer in the Railway Motor Department, with charge of the design and construction. About one year later he was placed in charge of the entire engineering department, and on Jan. 1, 1897, was promoted to the position of Assistant Superintendent. The following March he was appointed Superintendent of the Cleveland works, having in charge the engineering department and shops. Prior to entering the electrical field, he was chief draughtsman of the "Bee Line" and later of the Big Four.

The New York Air Brake Co. will furnish brakes for 1,000 of the new cars recently ordered by the Union Pacific. Westinghouse air brakes will be applied to the balance, 2,150.

F. M. Pease (Incorporated) of Chicago, Ill., has sold one locomotive to the Deckerville, Osceola & Northern R. R. Co.

The Michigan Lubricator Co., Detroit, Mich., is now putting on the market a new lubricator, which it is claimed works properly with high steam pressures, under all conditions, with but one connection to the boiler.

The Schoen Pressed Steel Co. is preparing plans for additions to its plant, which will increase the capacity for building steel cars from 20 up to 50 cars per day.

Boone V. H. Johnson has been appointed Assistant Engineer of the Safety Car Heating & Lighting Co. at St. Louis, in place of W. H. Hooper, promoted to the position of General Agent of the same company at Chicago. Mr. Johnson was formerly with the Pullman Company, and recently with the New York, New Haven & Hartford R. R. Co. at New Haven, Conn.

The machine tool works which have been owned and operated by the Davis & Egan Machine Tool Co., Cincinnati, O., are about to be reorganized under the name of the American Tool Works Co., under the laws of West Virginia, with a capital of $1,000,000. This is made necessary by the rapid growth of the business. The Davis & Egan Co. was incorporated with a capital of $500,000, and has always paid 12 per cent. dividends to its stockholders. The stock of the new organization is to be issued half to represent the old interests, which is to be common, and the new half, which will be all preferred. Of the preferred, $200,000 has already been subscribed; $100,000 is for sale, and the remaining $200,000 will be retained for the present as treasury stock. This preferred issue will be cumulative, 6 per cent. dividend, non-voting stock. All the old officers are retained, except Vice-President Burtner.

The Silver Bros. Iron Works Co. of Salt Lake City, Utah, has been incorporated, with a capital stock of $90,000, divided into 900 shares, to manufacture machinery, structural iron and steel work. John A. Silver is President; Hiram A. Silver, Vice-President, and Joseph A. Silver, Treasurer, Secretary and Manager.

Messrs. Fitz-Hugh & Co., Monadnock Block, Chicago, have made arrangements with the Chicago & Northwestern R. R. Co. for the sale of all the lightweight equipment used on that system that is being replaced with the heavier type recently adopted.

The Chicago grain door has been specified on the 1,000 new box cars which the Chicago, Milwaukee & St. Paul is building at its own shops at West Milwaukee and mentioned in our previous issues.

Monarch brake beams have been specified on the 25 stock cars which the Minneapolis & St. Louis is building, and also on the 32 locomotives recently ordered by the Great Northern from the Brooks Locomotive Works.

Iron and Steel.

The Carpenter Steel Works have put in operation the crucible department of the plant of the Diamond Steel Co., at Reading, Pa., which they leased as an additional projectile plant.

At the annual meeting of the stockholders of the Easton Foundry & Machine Co., Easton, Pa., the following officers were elected: President, Frank Ormsby, Newark; Secretary and Treasurer, Fred Nesbitt, Wilkes-Barre; Superintendent, George B. Sherry, Easton. These, with Abram Nesbitt and George Nesbitt of Wilkes-Barre, constitute the Board of Directors.

The Directors of the American Steel & Wire Co. have elected the following officers: John W. Gates, Chairman; John Lambert, President; William Edenborn, First Vice-President; Isaac L. Ellwood, Second Vice-President; Stewart A. Chisholm, Third Vice-President; E. T. Schuler, Treasurer; E. J. Buffington, Secretary; Frank Baacka, General Manager; C. H. Garvey, Auditor; E. H. Gary, General Counsel; E. C. Lott, General Sales Agent, Chicago office; E.

J. Buffington and C. S. Roberts, assistants; W. H. Howe, Manager, and T. V. Coales, assistant, Pittsburgh office; F. E. Paterson and T. P. Alder, assistants, New York office; E. R. Pool, Denver agent, having jurisdiction of Colorado, Utah, Wyoming and Montana; W. W. Bierce, New Orleans agent, in charge of Louisiana, Mississippi, Alabama, Georgia, Florida, North Carolina and South Carolina. Thos. H. Taylor, recently with the Washburn & Moen Mfg. Co., has been appointed manager of the works at Cleveland, formerly owned by the American Wire Co.

New Stations and Shops.

The St. Louis Southwestern is asking bids on a 20-stall brick roundhouse and two-story office building and store room at Tyler, Tex.

The Kansas City, Pittsburgh & Gulf has given a contract to Barnett & Record of Chicago to build a grain elevator at Port Arthur. The dimensions are: Grain elevator, 168 ft. x 70 ft.; engine and boiler room, 80 ft. x 30 ft.; conveyor, 1,100 ft. long; capacity, 500,000 lbs.

In connection with the track elevation work at Chicago, a new passenger station will be built at Englewood for the joint use of the Lake Shore, the Rock Island and the Fort Wayne roads. As soon as the plans are completed and approved by the three roads bids will be asked for the building of the station, which must be finished by the end of the summer, when the tracks at this point will be elevated. The station will be triangular in shape, fronting south, west and northeast, with platforms on the three sides for the use of the three roads. The cost of the station will be about $30,000.

Interlocking.

The National Switch & Signal Co. has put in a plant at the junction of the Chicago & Northwestern and the Chicago, Burlington & Quincy at East Clinton, Ill. It consists of 11 working levers and five spare spaces. There are four levers for seven switches and five locks, one lever for two facing point locks, and six levers for eight signals. The plant is equipped with electric locking with hand release wheel, as recently described and illustrated in the Railroad Gazette (March 11, page 174.)

Railroad Testing Laboratory at Purdue.

We have noted from time to time the progress of the movement and the final decision of the Executive Committee to put the M. C. B. brake shoe testing machine in Purdue University. A new building is now being erected which will provide suitable quarters for this and other apparatus for engineering research along lines which are of special interest to master car builders and superintendents of motive power. This building, which is to be 50 ft. wide by 100 ft. long, will form an addition to the present mechanical laboratories, being located between the steam engineering and locomotive laboratories, to both of which it will be connected by passage ways.

Safety Appliances on Cars and Engines.

The statistics gathered by the Interstate Commerce Commission concerning the equipment of freight cars with automatic couplers and train brakes, and the casualties to employees for the five years ending with 1897, which were recently called for by Congress, have been printed, as Senate document No. 140, which can, no doubt, be had on application to the Secretary of the Commission. The pamphlet contains lists of (1), the 42 companies whose cars and engines are all equipped; (2), the 483 companies reporting various percentages equipped; (3), the 84 companies owning engines, but not owning freight cars; (4), the 125 companies owning no equipment; (5), the 56 companies not reporting; (6), the 49 companies whose equipment is reported by other companies; (7), the 127 companies that have taken no steps to comply with the law, and (8), all railroads, showing the condition of their equipment and the number of employees killed and injured in each of the five years 1893-1897. The summary shows that in 1896 there were 831,688 employees, and that the total number of employees killed during the five years named was 9,954. The figures for the five years are:

	Killed.	Injured.
1893	2,727	31,724
1894	1,826	23,395
1895	1,811	25,696
1896	1,861	29,969
1897	1,732	27,623

The first table, that showing companies having 100 per cent. of their cars and engines equipped, contains mostly very small roads, though we find in it the Delaware, Susquehanna & Schuylkill, the Duluth & Iron Range and the Richmond, Fredericksburg & Potomac.

Electricity on the "St. Paul."

The Chicago City Council, April 6, passed an ordinance granting to the Chicago, Milwaukee & St. Paul Railway permission to equip its Evanston branch with an overhead trolley. The franchise is limited to 20 years and the railroad is to pay $5,000 to the city as compensation. The ordinance will probably be vetoed by the Mayor who considers the compensation inadequate.

A Storage Battery Meter.

The General Electric Company has made a special type of meter designed to show the amount of energy available in a storage battery. It is a development of the Thompson recording Watt-meter, with additional precaution against injury from shock or vibration. The essential requirement for a storage battery meter is that the armature shall revolve in either direction with equally accurate readings. The new meter answers this requisite. The energy put into the cells is added to the reading of the meter, while that withdrawn is subtracted; but to compensate for the loss in the cells the meter runs more slowly when charging. A reading shows the amount of energy available in the battery, not the amount put in. These meters are made with any desired percentage of difference between charging and discharging rates, but, as this percentage varies in almost every different case, the meters are made only to order. The 50-ampere meter may be considered as standard, and can be more promptly furnished than any other.

New York Harbor.

Last week Lieut. Colonel William Ludlow, Corps of Engineers, U. S. A., sent to the Chief of Engineers a report on his re-survey of the channels of New York Harbor. He recommends the improvement of the east channel, thus opposing the conclusion of his predecessor, Colonel Gillespie, who recommended the deepening of the main channel. Colonel Ludlow estimates that a channel 2,000 ft. wide and 35 ft. deep could be made for a total cost of $3,200,750. This allows for 29,100,000 cubic yards of dredging at 7½ cents, amounting to $2,182,500, contingencies $218,250, and four pump dredges at $200,000 each. It is further estimated that if this work is given out to be done by contract 20 per cent. must be added. A channel 1,000 ft. wide and 35 ft. deep could be made within 15 months and the full width of 2,000 ft. could be secured in from 2½ to 3 years. One advantage would be that the work in the east channel could be carried on without interference from the shipping passing in and out. In military security the east channel would not be quite so advantageous as the main channel. It lies about midway between Coney Island and Sandy Hook, being, on the average, about 3½ miles distant from either shore. This range is somewhat greater than is regarded desirable in connection with torpedo defense and the protection of the torpedo fields from interference, but it is quite likely that the Romer shoal will be occupied for defense hereafter. "Furthermore, hostilities are abnormal and exceptional and commerce is habitual and constant. In such a great port as New York the disposition of the channels should facilitate to the utmost the movements of shipping."

THE SCRAP HEAP.

Notes.

The Pullman Palace Car Co. has renewed for 15 years its contract to run sleeping cars over the lines of the Union Pacific. It has been reported that the Wagner Company would get this contract.

The Michigan Legislature has failed to approve the bill for laying additional taxes on railroads which was proposed by Governor Pingree in his call for the extra session of the Legislature. The bill was passed in the Lower House by a large majority, but failed in the Senate by a single vote.

The pattern room connected with the shops of the Southern Pacific at Sacramento was destroyed by fire on the night of April 8. It is said that all of the valuable patterns of the company, accumulated during the past 20 years, were burned up. The car shops and other buildings of the Newburyport Car Co., at Newburyport, Mass., were burned down on the night of April 9. The loss, including eight finished street cars, is estimated at $30,000.

The Southern Railway is now advertising in the Northern and Eastern states by means of a stereopticon, which is shown by an experienced lecturer, Dr. A. G. Rogers. The lecture has been given in New York, Philadelphia, Washington, Pittsburgh, Syracuse and a half dozen New England cities. At some places it is given under the auspices of some local association, and in such cases a small admission fee is sometimes charged for defraying the expenses of the hall. The lecturer, in showing the pictures, describes the mountain scenery of North Carolina, life in town and country all over the states traversed by the Southern Railway, and also shows views of the pleasure resorts and of the industrial establishments of the South. Dr. Rogers has engagements for a large number of cities and towns, his tour extending throughout the summer.

Uniforms for Enginemen on the Lake Shore.

On the Lake Shore & Michigan Southern all enginemen and firemen are now required to wear uniforms. An order has been issued by the Superintendent of Motive Power describing the garments and requiring their use after April 1.

The uniform consists of coat and overalls made of blue overalling and caps made of black Italian cloth. Summer and winter caps have been provided, but the men may wear either, as they choose. Badges and buttons will be furnished by the company. Uniforms will be examined and approved by the Master Mechanics, who will decide when they shall be renewed. The coat is single-breasted sack, five buttons; short, soft roll, and square corners. Two outside breast pockets, and two outside lower, with flaps. The trousers will be in the "prevailing style," with or without apron; with suspenders made of the same material as trousers, sewed on at back. No pockets. The caps, in summer, are to be made of black Italian cloth; Navy style crown; drop patent leather peak, black outside and green inside. In winter same material and style as summer, except that they will have ear and neck protection, and be slightly padded. Gilt buttons are to be used by engineers and silver by firemen. The buttons bear the letters "L. S. & M. S." with a raised form of a ten-wheel locomotive and tender. Badges will be worn on the caps, to be printed on silk ribbon, with the initials of the road and the word "Engineer," or "Fireman." For engineers the letters are in gilt and for firemen silver.

Luxury in the Wilderness.

A press dispatch from London states that the Russian Government has provided for the Siberian line a train de luxe, composed of four splendid cars, built at Moscow. There is an open saloon car, a dining car, a bathroom, a library, telephone, electric lighting, refrigerators, and ventilating apparatus, piano, chess boards, and means for gymnastic exercise. This will make the Pennsylvania and the New York Central, and the other American originators of luxurious trains, hide their heads in confusion. American passengers have, perhaps, all the luxury that they have been taught to appreciate, but we must admit that Russia has beaten us. The first half dozen features of the Siberian train are familiar matters here, even telephones being at our command if we want them; moreover pianos have been used in American cars, and something even better than a chessboard may be found in most smoking cars, even those used by the plebeian classes; but when it comes to gymnastics we give up. We have no better expedient than to stop 20 minutes and let the passengers walk up and down the station platform. Whether the Russian apparatus consists of a pair of 50-cent dumb bells or of only a 38-in. cane, is not stated.

A Civil Engineer.

Tom Maguire is a genius. He is yard foreman at the Laclede Gas Company's plant. A sewer pipe leading from one of the buildings to the river bank, 160 feet away, became clogged. The pipe is 16 feet below the surface. Maguire had been thinking about a plan for several days. One night he caught two big gray rats, and these he determined to put into the sewer. They were taken to the mouth at the river bank and released. The opening was then closed securely behind them, leaving the animals with only one chance of life. That was to go straight ahead. And they did. Several more rats were caught and turned into the sewer, until a dozen were gnawing away in the pipe. The morning after the last detachment joined the main army, water began to trickle from the pipe. Iron rods and steam were applied. In ten minutes the sewer was clear.—St. Louis Post-Dispatch.

Engineering is directing the sources of power in nature to the use and convenience of man; therefore Tom is an engineer.

Sale of the Nicaragua Railroad.

The Atlas Steamship Co. has bought the National Railroad of Nicaragua. This line is not yet completed and extends from Corintho on the Pacific Coast, east about 58 miles, and from Managua, east about 32 miles, to Grenada. It is stated that the Atlas line will run steamers to Valparaiso and California ports. This company also has a contract with the Nicaraguan Government to build a railroad from Salico Lagoon to the San Juan River.

Steel Car Steps.

A number of railroads are making trials of the Q & C Stanwood steel car steps on passenger cars, and it is not unreasonable to expect that they will be found suitable for such service. These steps, which are made by the Q & C Co., Chicago, are now used quite generally on street cars.

A Library for the Men.

We have before now mentioned the flourishing Metropolitan Street Railway Association, organized largely through Mr. Vreeland's efforts among the employees of the Metropolitan Street Railway Company of New York City. It is a mutual relief association and has a club room, reading rooms, library and various conveniences and attractions. We have just received a copy of the catalogue of the library. This comprises about a thousand well selected volumes of fiction, books of travel, scientific and technicl books, history, biography, etc. The library is open only to members of the association, and to them it is free.

Armour Institute of Technology.

The first exhibit of the work of Armour Institute will be that made at the Trans-Mississippi Exposition to be held at Omaha this summer, and Prof. A. M. Feldman is preparing plans for an exhibit showing the progressive stages in all departments by drawing models and apparatus made by students. A series of tests of a new kind of pressed brick is now being conducted in the mechanical engineering laboratory. The electrical engineering department is making tests on a 5 H. P. synchronous motor.

LOCOMOTIVE BUILDING.

We understand that arrangements will shortly be made by the directors of the St. Paul & Duluth Railroad to buy three freight and three passenger engines.

The Interoceanic Railroad of Mexico has placed an order with the Schenectady Locomotive Works for four locomotives for delivery early in June. It is probable that this order will be increased to 10 or 12.

The Brainerd & Northern Minnesota has placed an order with the Richmond Locomotive Works for one simple and one compound mogul engine. The former will have 16½x26-in. cylinders and the latter 18 and 28½x26-in. cylinders. Both types will weigh 100,000 lbs., with 86,000 lbs. on the drivers, and will have 56-in. drivers, radial stay extended wagon top boilers, with a working steam pressure of 200 lbs.; firebox, length 84 in.; width, 34 in.; tank capacity, 3,400 gals. Westinghouse brakes, Monitor injectors, U. S. metallic piston and valve rod packings, Crosby valves, Leach sanding devices and Nathan lubricators will be used.

The Toledo & Ohio Central ordered April 8, from the Brooks Locomotive Works, five 10-wheel simple freight locomotives, to be delivered in July and August. These engines are to have cylinders 18 in. x 24

in., drivers 56 in. in diameter; a total weight of 120-000 lbs., of which 96,000 lbs. will be on the drivers; Belpaire boilers, working steam pressure 180 lbs.; firebox 97 in. long x 33 in. wide, and a tank capacity for water of 4,000 gals. American outside equalized brakes for drivers and Westinghouse air brakes for train service, Marden brake beams, Sargent brake shoes on the drivers, Tower couplers, No. 9 Ohio injectors, Crosby safety valves, Houston sanding devices, Detroit lubricators, Midvale tires and Jerome piston and valve rod packing will be used. The axles will be toughened steel, bearings Damascus bronze, and the wheel centers cast iron 50 in. in diameter.

CAR BUILDING.

The Mexican National is building 100 freight cars at its Laredo shops.

The Illinois Central is asking bids on 500 freight cars of 80,000 lbs. capacity.

The Barney & Smith Car Co. is building 100 cars for the Southern Pacific.

The Wells & French Co. is building three freight cars for the Fairchild & Northeastern Railroad.

The Heatherington & Burne Railroad is having two cars built at the works of the Terre Haute Car & Mfg. Co.

The Oahu Railroad & Land Co. of Hawaii has placed an order with the Missouri Car & Foundry Co. for 12 freight cars.

The Minneapolis & St. Louis is building 25 stock cars at its own shops, the dimensions and equipment to be similar to the box cars recently ordered by this road from the Illinois Car & Equipment Co.

We are officially informed that the Houston & Texas Central is not asking bids on new freight cars, as has been reported in some of the railroad papers. This road is arranging to build at its Houston shops about 600 30-ton rigid freight car trucks.

The Louisville & Nashville has ordered 100 furniture cars from the Missouri Car & Foundry Co. and 250 gondola cars, of 60,000-lbs. capacity, from the Illinois Car & Equipment Co. The latter are for May delivery, and will be equipped with Westinghouse air brakes, Sterlingworth brake-beams, Christie brake shoe, Ajax brasses and iron axles. The couplers will be furnished by the railroad company.

The Canadian Pacific will build at its shops 300 flat and 500 box cars for delivery between now and August. They will be of 60,000 lbs. capacity and 35 ft. long; the flat cars will be 8 ft. 6 in. wide over frames and 4 ft. 2 in. high, and the box cars 8 ft. 11 in. wide over frames and 7 ft. 2 in. high inside. All cars will have M. C. B. 4¼ in. x 8 in. steel axles, C. P. standard bolsters, Marden brakebeams, Westinghouse air brakes, Hein couplers, M. C. B. cast-iron journal boxes and journal box lids, C. P. standard five-coil springs and 30-ton trucks and cast-iron wheels to weigh 600 lbs. each. The box cars will have Mallory brackets, Dunham doors and Chicago roofs.

In our last issue we published a report that the Interoceanic Railroad of Mexico would buy 1,000 new freight cars, and that the General Manager would visit the United States this month for the purpose of buying this equipment. Henry E. Walker, Locomotive and Car Superintendent of the road, who is at present in the United States, informs us that the road will not buy 1,000 new cars, but that he has authority to place an order for 50 box, 25 stock and 25 ballast cars. The St. Charles Car Co. and the Missouri Car & Foundry Co. have put in bids for furnishing this equipment, and Mr. Walker was scheduled to be in St. Louis the last of this week to place the order.

BRIDGE BUILDING.

ABERDEEN, S. DAK.—The Council has under consideration the question of building a viaduct over the railroad tracks at North Main St.

ALEXANDRIA, LA.—The Alexandria Bridge Co., Ltd., has been incorporated with a capital of $75,000 to build a bridge across Red River, between Alexandria and Pine Bluff. Among those interested are F. M. Welch, E. J. Barrett, G. O. Watts and F. F. Rogers.

AKRON, O.—Lake Erie & Western will require 10 or 12 bridges on the proposed extension from Akron. (Railroad Construction column.)

ATLANTA, GA.—The contracts for building the Mitchell St. viaduct will probably be awarded: Gude & Walker, Atlanta, masonry; Grant Wilkins, Atlanta, superstructure. The bids for superstructure were as follows: Milwaukee Bridge & Iron Works, $56,-700; New Jersey Steel & Iron Works, $53,300; Edgemoor Bridge & Iron Works, $47,750; Union Bridge Company, $56,640; Gude & Walker, $50,200; Massillon Bridge Company, $54,775; Carnegie Steel Company, $49,244; Youngstown Iron & Bridge Company, $51,859, less $473, reduced by telegraph; George E. King Bridge Company, $53,800; A. P. Roberts & Co., $52,-797; Toledo Bridge Company, $50,434; Grant Wilkins, $47,598; Wrought Iron Bridge Company, $50,996; Wisconsin Bridge Company, $53,667; Shults Bridge & Iron Company, $53,000; King Bridge Company, $55,679.24. City Engineer, Mr. R. M. Clayton, estimates the total cost of the viaduct at $74,240. (Jan. 21, Feb. 4, pp. 48, 85.)

BEVERLY, O.—It is stated that a new bridge will be built over the Muskingum River, probably by Washington County.

BUTLER, MO.—Bates County will build a number of iron bridges. W. M. Cranford, County Clerk.

CHOTEAU, MONT.—The Commissioners of Teton county will build a bridge across Marias river.

DAYTON, O.—The proposition to issue $250,000 in bonds for building new bridges over the Miami river at West Third and North Main streets was defeated at the municipal election held April 5.

DANVILLE, QUE.—Bids will be received until April 20 for a steel bridge for the corporation of Shipton, width of bridge to be 16 ft.; distance between abutments, 40 ft. Address C. C. Brown, Secretary, Danville.

EASTON, MD.—Proposals will be received until May 12 by the County Commissioners of Caroline and Talbot counties for building a bridge over the Great Choptank River at Dover Bridge. The bridge will be an iron truss, 324 ft. long. Address Charles F. Stewart, Clerk, Talbot County, Easton.

EL PASO, TEXAS.—Press reports state that the Atchison, Topeko & Santa Fe will rebuild the bridge over the Rio Grande at El Paso. The new bridge, of steel, will cost about $100,000.

FORT WAYNE, IND.—It is stated that the New York, Chicago & St. Louis will build a new bridge over the tracks of the Pennsylvania west of Fort Wayne.

GARFIELD, N. J.—The boards of freeholders of Bergen and Passaic counties, it is stated, are considering a new bridge at Garfield.

GLOVERSVILLE, N. Y.—The Council has under consideration a bridge at Grove St.

JACKSONVILLE, ILL.—Press reports state that a number of new iron bridges will be built in Morgan County.

LOS ANGELES, CAL.—Press reports state that the city of Los Angeles will issue bonds for bridge building and repairing.

MEXICO CITY, MEX.—The Vera Cruz & Pacific will build railroad bridges. (Railroad Construction column.)

MONROE, LA.—Monroe Railway & Construction Co. will build an iron draw-bridge. (Railroad Construction column.)

NEWARK, O.—The Commissioners of Licking County have been authorized to issue $50,000 bonds for building new bridges.

NEWTON, MASS.—City Engineer H. D. Woods has prepared plans for the abolition of grade crossings on the Circuit Line of the Boston & Albany in Newton Center, Newton Highlands and Chestnut Hill. Eight grade crossings are considered in the estimate, and the total cost is figured at $752,000, as follows: Work by the railroad—Depression of tracks, $151,037; masonry and paving, $165,006; solid flooring of bridges, $52,556; stations and approaches, $47,600; land damages, $33,801; 10 per cent. for contingencies, $45,000; total, $495,000. Work by the city—Filling and grading at stations, $47,342; drains and brooks, $92,-100; sewer changes, $1,071; water pipes, $3,500; damages, $89,627; contingencies, $23,360; total, $257,000. Under the general law, the city's share of the expense would be 10 per cent. of this last amount, making the cost as follows: City, $75,200; state, $188,000; railroad, $488,800.

OTTAWA, ONT.—The Lewes River Tramway Co. has applied for a charter to build an electric or horse railroad around the obstructions to navigation at Miles Canyon and White Horse Rapids, on the Lewes River. This company proposes to operate on the eastern side of the river. Another company to be known as the Miles Canyon & White Horse Tramway Co. has applied for a similar charter of incorporation to operate on the west side.

PENACOOK, N. H.—Press reports state that a new bridge will probably be built over the Contoocook river on Main St.

PETERSBURG, VA.—The Richmond & Petersburg will build a new bridge over Swift Creek, it is stated.

ST. JOSEPH, MO.—Concerning the viaduct to be built at St. Joseph, we are informed that, if built, it will be paid for by the city, street and steam railroads jointly. Some of the steam railroads have not assented, and the time has not yet come when plans will be agreed upon. If the viaduct is built, it will be built under the direction of the City Engineer of St. Joseph, Mr. C. W. Campbell, the plans being assented to by the railroad companies. The total cost of the viaduct, with all approaches, will be between $35,000 and $40,000.

VANCOUVER, B. C.—Press reports state that the Board of Public Works has asked for an appropriation of $20,000 to build a steel bridge.

VICTORIA, B. C.—Among the items in the provincial estimates there is $30,000 for the Thompson river bridge at Kamloops.

The Provincial Lands and Works Department has arranged to erect a new steel bridge to span the Arm at The Gorge.

WARREN, PA.—The Borough of Warren will shortly call for bids for a bridge. L. T. Borchers, Chairman Bridge Commission; D. F. Wheelock, City Engineer.

WASECA, MINN.—The Commissioners of Waseca County will immediately ask for bids for building a steel bridge.

WATERBURY, VT.—It is stated that the Central Vermont will build a bridge at North Main St.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Belt Railroad & Stock Yards (Ind.)—Quarterly, 1½ per cent., payable April 1.

Chicago & Western Indiana.—Quarterly, 1½ per cent., payable April 1.

Vermont & Mass.—Guaranteed, 3 per cent., payable April 7.

Brooklyn City.—Quarterly, 2½ per cent., payable April 15.

Louisville Railway.—Common, 1¼ per cent.; preferred, quarterly, 2½ per cent.; payable April 1.

Waterbury (Conn.) Traction.—One per cent., payable April 1.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Society of Civil Engineers.—Meets at the house of the society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month at 8 p. m.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7.30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

Chicago Electrical Association.—Meets at Room 7,137, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Thursday of each month, excepting July and August, at 7.30 p. m.

Engineers' Club of Columbus (O.).—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of Philadelphia.—Meets at the house of the club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburg, Pa., on the third Tuesday in each month at 7.30 p. m.

Locomotive Foreman's Club.—Meets every second Tuesday in the clubroom of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Master Car Builders' Association.—Saratoga Springs, N. Y., Wednesday, June 15.

Master Mechanics' Association.—Saratoga Springs, N. Y., Monday, June 20.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1,533 Marquette Building, Chicago, is secretary.

Western Railway Club.—Meets in Chicago on the third Tuesday of each month at 2 p. m.

Western Society of Engineers.—Meets in its rooms on the first Wednesday of each month at 8 p. m., to hear reports and for the reading and discussion of papers. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago.

The Chicago Electrical Association.

A meeting of the Chicago Electrical Association was held Friday evening, April 15, at Room 1,737, Monadnock Block, Chicago. Mr. W. R. Garton read a paper entitled "The Electric Railway," and the discussion was led by Mr. W. A. Harding.

New England Association of Railroad Superintendents.

At the annual meeting of this Association, in Boston, April 4, the following officers were elected: President, C. C. Elwell (New England R. R.), Norwich; Vice-President, W. G. Bean (Boston & Maine), Boston; Secretary, C. E. Lee (Boston & Maine), Nashua.

North-West Railway Club.

The next meeting of the North-West Railway Club will be held at the Ryan Hotel, St. Paul, on Tuesday, April 19, at 8 p. m. Mr. C. E. Stafford of the Illinois Steel Co. will give a lecture, illustrated by a stereopticon, upon the South Chicago plant of that company, describing particularly the manufacture of steel plates and rails.

The Engineers' Club of Philadelphia.

A business meeting of the club will be held on Saturday, April 16, 1898, at 8 o'clock p. m. The papers will be on "The Deep Well Pumping Plant at Waukesha, Wis.," (illustrated), by J. W. Ledoux, and "A New Inertia Indicator," by Wilfred Lewis.

At the meeting of April 2, Dr. Henry Leffmann presented a paper on "The Engineering Chemistry of Boiler-Waters."

Western Society of Engineers.

A meeting of the Western Society of Engineers was held Wednesday evening, April 6, in the society rooms, Monadnock Block, Chicago. Two papers were presented, one by General William Sooy Smith on "Fireproof Construction," and one by Mr. Frank B. Abbott on "Fireproofing of Warehouses." In our issue of Feb. 18 last, a brief description was given of Mr. Abbott's plan for a fireproofing as applied to a 15-story warehouse now being built, at Chicago, under his supervision. These papers will be printed and distributed to members before the next meeting,

April 20, at which time they will be discussed. The subject of "Electrical, Pneumatic and Mechanical Power Transmission in Manufacturing Plants" will also be discussed at the next meeting.

Western Foundrymen's Association.

The next meeting of the Western Foundrymen's Association will be held at the Great Northern Hotel, Chicago, at 7:30 p. m., Wednesday, April 20, 1898.

The following topical questions will be taken up in their order:

Is it economical to ventilate a foundry artificially? What has been your experience?

What is the best method of lighting a foundry of modern design?

Have any members had experience with Thurston's Autographic Torsion Machine? If so, does it possess merit over other forms of machines now in use for testing cast iron?

In order to overcome the variation in size of test bars incident to molding, is machining down to size to be recommended?

What is your experience as to the effect upon coke of exposing same freely outdoors?

What is your experience as to the utility and efficiency of flexible shafting for use with grinders on heavy and intricate castings?

In accordance with the by-laws, all nominations for officers, Board of Directors and Editing Committee for the ensuing year, must be sent to the Secretary at or before this meeting. The annual election will occur at the May meeting.

The St. Louis Railway Club.

At the regular meeting of the St. Louis Railway Club, held in the parlors of the Southern Hotel, St. Louis, March 11, President W. G. Besler in the chair, a committee reported, in reply to the question put by Mr. H. W. Gays, General Manager C., P. & St. L., in a letter to the secretary of the club, as to why there is a variation in the journal load carried by trucks. The Committee on Revision of M. C. B. rules also made its recommendations. The following papers were read: "The Claim Agent; His Relations to Various Departments of Railways," by Mr. S. D. Webster, Freight Claim Agent, Terminal Railway Association, St. Louis; "The Supply Man: What He Has Done to Improve the Railroad Service," by Mr. George E. Howard. The following communications were read: "Should the Government Undertake to Regulate the Construction of Railroads?" by Prof. Arthur T. Hadley, Yale University; "Cab Service in Connection with the Passenger Department," by Mr. J. R. Wood, General Passenger Agent Pennsylvania Railroad. Besides remarks on the foregoing, discussion also took place on the following: "The Availability of the Track Water Tank for the Average American Practice," "The Staff System versus the American Train Dispatcher," "Shop Etchings." In this last discussion Mr. J. A. Carney, Master Mechanic C., B. & Q., took a leading part, and his illustrations are reproduced in the printed transactions. Abstracts of several of these papers and discussions have already been published in the Railroad Gazette.

Civil Engineers' Society of St. Paul.

A regular meeting of the Civil Engineers' Society of St. Paul was held at 8.15 p. m. April 1. President Estabrook presided. Present 12 members and six visitors. Mr. H. E. Stevens, lately returned from the scenes of his subject, gave a two hours' talk on ship canals as exemplified in Panama and Nicaragua. There are some drawbacks to the Nicaragua project. No adequate foundations seem to be found for the dams and a dam on the Ochoa site would necessitate many other embankments of questionable expediency. Furthermore, the physical features at the terminals, especially on the Atlantic, present obstacles very difficult to surmount.

As to the estimated cost of this canal, notwithstanding the many surveys, data are still lacking on which to base an intelligent estimate. Inasmuch as one dollar in gold should accomplish nearly as much there as here, the unit prices on which the estimate of the Ludlow Commission is based, twice the unit prices in the United States, seem to be a little extravagant.

In Panama the Chagres problem is rumored to be nearing solution. This is to divert the flood discharge of the river, which is nearly twice as large as that of the Mississippi at St. Paul. The terminal conditions are also favorable on this route; 3,500 men are now in the Culebra cut, working by primitive and ineffectual methods. The evidences of extravagant waste and gigantic jobbery which marked the conduct of the work in Panama for several years are astounding. A remarkable feature of the clay cuts on both routes is the permanent standing of the quarter to one slopes, unaffected by the torrent of rain, the average monthly precipitation of Greytown being about that of the average year with us.

PERSONAL.

—Privy Councillor Bausch, Engineer of the Emperor William Canal (Baltic and North Sea Canal), died in Berlin, Germany, April 8.

—Mr. Charles H. Foster, for 19 years Secretary and Treasurer of the Chicago & Alton, died after a brief illness at his residence in Chicago, Ill., on the evening of April 12. Mr. Foster was born in Rochester, N. Y., April 14, 1835, and entered railroad service in 1855. January 11, 1865, he was appointed General Accountant of the Chicago & Alton and held that office until May, 1879, when he was made Secretary and Treasurer, which position he held until his death.

—Mr. Rowland B. Minturn, Superintendent of the Northern Division of the Chicago, Milwaukee & St. Paul, with office at Green Bay, Wis., died at his home in Green Bay April 6. Mr. Minturn was born in Ferrisburgh, Vt., Aug. 27, 1849, and entered railroad service in 1872 with the Chicago & Northwestern. He had been since then Lost Freight Agent, Traveling Contracting Agent and Civil Engineer. In 1889 he was appointed Division Superintendent of the Chicago, Milwaukee & St. Paul at Babcock, Wis., and was transferred to Green Bay in 1895.

—The death of Mr. Walter Dawson, at one time General Master Mechanic of the Delaware, Lackawanna & Western, was announced in New York April 12. Mr. Dawson was born in London, England, in 1823, and entered railroad service in 1851. In 1865 he was with the New York Central & Hudson River as Locomotive Engineer, and later became Master Mechanic of a division shop on that road. He was appointed Master Mechanic of the Delaware, Lackawanna & Western at Scranton, Pa., in October, 1867, and later made General Master Mechanic at the same place, which position he resigned in 1886.

ELECTIONS AND APPOINTMENTS.

Alabama Great Northern.—C. M. Billheimer, Traveling Passenger Agent, at Birmingham, Ala., has resigned. The resignation took effect April 1.

Atlantic & North Carolina.—David W. Patrick has been appointed President by Governor Russell, succeeding Robert Hancock. (March 4, p. 168.)

Baltimore & Lehigh.—G. W. Seidl has been appointed Master Mechanic, with headquarters at Baltimore. The office of General Foreman of Locomotive Repairs has been abolished.

Baltimore & Ohio Southwestern.—Jacob B. Kelley, heretofore of the Advertising Department of the C., C., C. & St. L., has been appointed Advertisng Manager of the B. & O. S. W., with office at Cincinnati, succeeding Jesse H. Webb.

Canadian Pacific.—J. W. Harkom, heretofore Master Mechanic of the Eastern Division of the Grand Trunk at Montreal, has been appointed Assistant Mechanical Superintendent of the Canadian Pacific.

Central of New Jersey.—R. C. St. John has been appointed Tax Agent. The office of Engineer of Construction has been abolished, and J. H. Thompson, who formerly held that position, has been appointed Chief Engineer, with headquarters at Jersey City, N. J.

Chicago Great Western.—Cornelius Shields, General Superintendent, with office at St. Paul, Minn., has resigned, resignation taking effect April 15. He will be succeeded by Raymond du Puy. Mr. Shields became associated with the C. G. W., then the Chicago, St. Paul & Kansas City, in 1888 as Assistant General Superintendent. He resigned in 1891 to become General Superintendent of the Western Division of the G. N., and returned to the C. G. W. in his former position in 1893. Raymond du Puy, the new General Superintendent, is President of the DeKalb & Great Western, which is a part of the C. G. W., with office at St. Paul. He was General Manager of the C., St. P. & K. C. in 1887. Appointments effective April 15.

Chicago, St. Paul, Minneapolis & Omaha.—L. F. Slaker has been appointed Superintendent of the Eastern Division, succeeding James McCabe, assigned to other duties. His headquarters are at St. Paul, Minn.

Cincinnati, Richmond & Ft. Wayne (Pennsylvania Co.)—At the annual meeting held in Richmond, Va., April 7, David Studebaker of Decatur, Ind., was elected a Director.

Cleveland, Akron & Columbus.—W. S. Wellock has been appointed Traveling Auditor, and F. H. Reeves has been made Paymaster, succeeding J. W. Lyons, promoted. (April 1, p. 244.)

Detroit, Toledo & Milwaukee.—Assistant General Freight Agent F. C. Whipple has not resigned, as reported in this column last week, but has been appointed General Freight and Passenger Agent, with headquarters at Toledo, O., succeeding C. H. Chambers, resigned. (April 8, p. 265.)

Galveston, Houston & Henderson.—At the annual meeting held April 5 Leroy Trice and N. A. Steadman of Texas were elected Directors, succeeding J. M. Campbell and John M. Duncan. Mr. Trice was elected Vice-President, succeeding Mr. Duncan.

Grand Trunk.—J. W. Harkom, Master Mechanic of the Eastern Division, with office at Montreal, has resigned.

Great Northern.—P. L. Clarity has been appointed Superintendent of the Division Terminals at Minneapolis, succeeding W. T. Tyler, transferred.

Gulf, Beaumont & Kansas City.—William Wiess of Beaumont, Texas, was elected a Director at the annual meeting held in Houston, Texas, March 31, succeeding J. N. Gilbert. John C. Averill was elected Treasurer. W. W. Willson, heretofore Treasurer and Assistant General Manager, has been appointed Assistant to the General Manager, with office at Beaumont. F. L. Buford has been appointed Assistant Engineer; W. W. Fortenberry, General Stock, Tie and Fuel Agent, and P. A. Work, General Right of Way Agent.

Houston & Texas Central (Southern Pacific).—At the annual meeting held in Houston, Tex., April 4, I. E. Gates of New York was elected Assistant Secretary and Treasurer.

International & Great Northern.—At the annual meeting held in Palestine, Tex., April 6, Leroy Trice, General Superintendent, was elected a Director, succeeding H. B. Kane. Mr. Trice was also elected Second Vice-President, succeeding Mr. Kane.

Iowa Central.—F. W. Boltz, General Agent, has transferred his office from Indianapolis, Ind., to Cleveland, O. (Jan. 28, p. 70.)

Kansas City & Pacific (Missouri, Kansas & Texas).—At the annual meeting held in Parsons, Kan., April 7, Colgate Hoyt was elected Vice-President, succeeding William Dowd. Simon Sterne was elected General Counsel, and James Hagerman General Solicitor.

Kansas City, Pacific & Gulf.—Alexander McDonald, Western Manager of the Standard Oil Co., with offices in Cincinnati, O., has been elected a Director of the K. C., P. & G.

Kansas City, Pittsburgh & Gulf.—C. B. Cleveland, heretofore Steamship Agent at the City of Mexico, has been appointed General Agent of the Freight and Passenger Departments, with office at the same place.

Lake Michigan & Lake Superior Transportation Co.—Joseph Austrian, who was recently elected President, succeeding the late S. F. Leopold, has announced the following appointments, taking effect April 11: Frank Ferris, General Freight Agent; Joseph Berolzheim, heretofore General Freight and Passenger Agent, to be General Passenger Agent and Auditor; Alfred F. Leopold, Assistant General Manager, all with offices at Chicago.

Lehigh Valley.—George W. Brill, heretofore Train Master at Delano, Pa., has been appointed Acting Superintendent of the coal branches, with headquarters at Delano, succeeding A. P. Blakeslee. (March 25, p. 224.)

Long Island.—At the annual meeting of the stockholders held at Morris Park, L. I., April 12, R. Somers Hayes was elected a director.

Minneapolis, St. Paul & Sault Ste. Marie.—Edward Pennington, heretofore Superintendent, has been appointed General Superintendent, and has made the following appoinments: Daniel Willard, Superintendent of the Wisconsin and Peninsular Divisions, including Minneapolis Terminals, with office at Minneapolis; Frank C. Batchelder, Superintendent of the Minnesota Division at Enderlin, N. D.; the offices of Assistant Superintendent of the Wisconsin, Peninsular and Minnesota Divisions have been abolished. The changes are effective April 15.

Missouri, Kansas & Texas.—At the stockholders' meeting held at Parsons, Kan., April 7, James Brown Potter was elected a Director, succeeding Thomas C. Purdy.

Mobile & Birmingham.—At the annual meeting held in Mobile, Ala., April 6, Thomas P. Fowler of New York City was elected a Director, succeeding Cecil Braithwaite, of Watford, England.

Mobile & Ohio.—John N. Lancaster, of Jackson, Miss., has been appointed Engineer of the Division from Okalona, Miss., to Mobile, Ala., with office at Mobile.

Ohio Valley & Junction.—The officers of this company, referred to in the Construction column, are: President and General Manager, J. F. Townsend; Vice-President, Henry Robinson; Treasurer, H. B. Manton; Secretary and General Freight Agent, B. W. Robinson; Superintendent, Thomas Kent; Chief Engineer, Paul Murray. The chief office is at Akron, O.

Pacific Express Co.—President E. M. Morsman, with offices in Omaha, Neb., resigned at a special meeting of the directors held in Omaha April 8.

Pennsylvania Co.—T. B. Hamilton, heretofore Engineer of Maintenance of Way of the Toledo Division, with office at Toledo, has been appointed Engineer of Maintenance of Way of the Cincinnati Division at Cincinnati, succeeding C. E. Lindsay, resigned. A. H. Sanford, of Allegheny, Pa., succeeds Mr. Hamilton at Toledo.

Philadelphia & Reading.—President J. S. Harris, of the Atlantic City R. R. announces that all employees late of the South Jersey R. R., referred to in the Railroad Construction column, will be continued in their present positions until further notice, and will report to Theodore Voorhees, Vice President, Reading Terminal, Philadelphia.

Pittsburgh, Ft. Wayne & Chicago (Pennsylvania Co.)—At a meeting of the stockholders held in New York City, April 6, Charles McCulloch of New York was elected a Director, succeeding Edward P. Williams of Ft. Wayne, Ind., resigned.

St. Louis & San Francisco.—B. L. Winchell, General Passenger and Ticket Agent of the U. P., D. & G., has been appointed General Passenger Agent of the St. L. & S. F., succeeding George T. Nicholson, resigned. The appointment is effective May 1. Mr. Winchell is also General Passenger Agent of the Denver, Leadville & Gunnison, with office at Denver, Colo. He entered railroad service in 1873, and was appointed General Passenger and Ticket Agent May 1, 1895.

Seaboard Air Line.—F. A. Bayles has been appointed Soliciting Freight Agent, with headquarters at 371 Broadway, New York City.

Sioux City, Chicago & Baltimore.—At the annual election of the S. C., C. & B., referred to in the Construction column, held at Sioux City, Ia., April 7, the following officers and directors were elected: President, T. P. Geer; Vice-President, F. A. Seaman; Treasurer, A. L. Stetson; Secretary, F. C. Hills. Other directors: M. Dimmitt, E. Barker, D. C. Shull and F. L. Wakefield. The general office is at Sioux City, Ia.

Southern.—J. F. Snyder, Agent of the Land and Industrial Department, with office at Birmingham, Ala., has resigned. The resignation took effect April 1.

Southern Pacific.—At the annual election held in San Francisco, Cal., April 7, General Manager J. Kruttschnitt was elected to the newly created office of Fourth Vice-President.

Terre Haute & Indianapolis.—F. F. Hildreth, and not Thomas W. Demorest, as reported last week, has been appointed Acting General Foreman of the Terre Haute shop, succeeding W. R. McKean, Jr., resigned. (March 18, p. 208; April 8, p. 265.) W. E. Weidgeon has been appointed Road Foreman of Engines for the Michigan Division, succeeding George H. Prescott, who has been appointed Round House Foreman at Logansport, Ind. The appointments were effective April 1.

Toledo, St. Louis & Kansas City.—General Superintendent Arthur L. Mills, with office at Toledo, O., has resigned, to engage in other business. He was appointed General Superintendent May 22, 1893.

United Railroads of New Jersey (Pennsylvania).—At a meeting held April 6, in Trenton, N. J., Andrew G. Green, of Trenton, and Henry P. McKean of Philadelphia were elected Directors, succeeding Charles E. Green and Thomas McKean, both deceased.

Washington & Columbia River.—The offices of the Assistant General Manager, occupied by Frederick Rogers, and Superintendent of Motive Power, occupied by J. M. Winslow, with offices at Walla Walla, Wash., have been abolished. Mr. Rogers still remains as General Freight and Passenger Agent. Effective April 5.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

ALBERENE.—Track laying has been finished in Albemarle County, Va., from Warten, on the Chesapeake & Ohio, north about 10 miles through the Arrow Head Slate Quarries to the Alberene Soapstone

Quarries. (April 1, p. 245.) About 50 men are at work. The maximum grade is 1 per cent., and the maximum curves 8 degrees, with three trestles. C. D. Laughorn of Greenwood, Va., is President; R. E. Shaw, Alberene, Secretary, and L. H. Lane, Esmont, Treasurer. (Official.)

ARKANSAS & CHOCTAW.—Grading has been completed for 12½ miles on the extension of this line west on the present terminus, and track-laying will begin in a few days. The company expects to have the extension completed by May 1, when contract will be let for 10 miles more of grading to be completed within 60 days. (Official.)
W. H. Carson of Texarkana, Tex., is Supt. (Dec. 24, 1897, p. 918.)

ARKANSAS & OKLAHOMA.—This company was incorporated in Arkansas April 1 with a capital stock of $200,000, to build a line in Benton County, from Rogers, on the St. L. & S. F., northwest via Bentonville, to a point on the K. C., P. & G. The incorporators are: John M. Bayless, Cassville, Mo.; E. J. Glasgow, St. Louis; F. A. Miller, Aurora; James A. Rice, Bentonville, Ark.; W. R. Felton, Rogers. (Official.)
This company is understood to be successor to the Bentonville Ry. (April 4, p. 247), whose line runs from Bentonville to Rogers, and has been bought by Mr. Bayless, who is President and General Manager of the Cassville & Western.

BABYLON & NORTH SHORE.—This company has been incorporated in New York with a capital stock of $160,000 to build a line from Babylon, L. I., north 16 miles to Northport, both points on the Long Island Railroad. Among the directors are Charles L. Eaton, William R. Bergholz, E. A. Dodge and Arthur P. Dodge of New York.

BUFFALO, ROCHESTER & PITTSBURGH.—Surveys are nearly completed for the Allegheny & Western extension from Punxsutawney, Pa., east through Mosgrove and Butler to New Castle, Pa., 98 miles. All the money need for building has been subscribed. A contract for 12 miles has been let, including a tunnel 23 ft. long, to the Pennsylvania Construction Co., Curwensville, Pa. Only a few men are at work. The work is heavy. The maximum grade is 1 p. c.; maximum curves, 9 deg. No bids will be asked for rolling stock at present. (Official.)
This line is to form a junction at New Castle with the proposed extension of the L. E. & W. (April 1, p. 245.)

CHICAGO, WAUKEGAN & NORTH SHORE.—This company was incorporated in Illinois April 8, with a capital stock of $100,000, to build a line from the Wisconsin state line, near the town of Benton, Lake Co., south nine miles, along the lake shore to Waukegan. Portion of right of way has been secured, and surveys are being completed. Contracts have been let for grading, and considerable has been done. Remaining contracts will be let when balance of right of way is secured. The incorporators are James H. Van Vlissingen, John E. Colnon, William C. Heinroth, Frank S. Read and Louis F. Nafis.

EVERETT & MONTE CRISTO.—Sixty men, according to report, are restoring this road from the washouts of last fall. It extends from Everett Junction, Wash., to Snohomish, 11.5 miles, and from Hartford Junction to Monte Cristo, 42.39 miles, with a trackage on the Seatle & International from Snohomish to Hartford Junction, 8.2 miles.

KINGS COUNTY ELEVATED.—Justice Dickey in the Supreme Court at Brooklyn has given permission to Receiver James H. Frothingham to issue $400,000 receiver's certificates to make the connections between the elevated road and the Brooklyn Bridge. (April 8, p. 256.)

LAKE ERIE & WESTERN.—Surveys are nearing completion for the proposed extension from Akron, O., via Cuyahoga Falls, Kent, Ravenna, Niles, Youngstown, Lowellville, O., east 85 miles, to New Castle, Pa. (April 1, p. 245.) Contracts will probably be let within four to six weeks. The work is heavy, including ten to twelve crossings of rivers. The maximum grade is 26.4 ft. to the mile; the maximum curve, 3 deg. (Official.)

McCLOUD RIVER.—Trains are in operation from Upton, Cal., on the S. P., south 20 miles to McCloud. (Feb. 18, p. 130.) The final plans of the company contemplate an extension toward Alturas, Modoc Co., 70 miles, but this will not be built this season. (Official.)

MEXICO, CUERNAVACA & PACIFIC.—Trains are running on 150 miles of this road from the City of Mexico southwest through Cuernavaca to Iguala. About 3,000 men are at work on the extension from Iguala to the Pacific Coast. (Official.)
G. A. Stranahan of the City of Mexico is Construction Engineer. (Dec. 24, 1897, p. 919.)

MONROE RAILWAY & CONSTRUCTION CO.—Surveys have been completed for this line from Monroe, La., southwest via Winnfield to Natchitoches, and building will begin May 7. The work is medium. There will be one iron drawbridge at Red River. (April 1, p. 245.) L. D. McLain of Monroe is President, and I. W. Sylvester Engineer. (Official.)

MT. PENN GRAVITY.—This road is being reconstructed and will be open to the public Apr. 17. It extends from Mineral Spring Park Station, Pa., to the summit of and around Mt. Penn, eight miles.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company expects to ballast with gravel on most of the line between Memphis, Tenn., and Hollow Rock this year, and to put this section in first-class order. (Official.)

NEW ROADS.—Some persons interested in ore property are building a line about five miles long to connect with the Chesapeake & Ohio at a point near Covington, Va.

OHIO VALLEY & JUNCTION.—The section from Beach City, O., southeast along the line of the Cleveland, Lorain & Wheeling to Canal Dover, has been completed, and the company proposes to extend the line northeast to Valley Junction. The officers are given under Elections and Appointments.

PENNSYLVANIA.—The new tunnel at Radebaugh, west of Greensburg, Pa., was opened for traffic April 9.

PHILADELPHIA & READING.—An offer has been made by the officials of this company to cooperate with the city of Williamsport, Pa., in rebuilding a portion of the Catawissa line of the P. & R. in that city to overcome the injurious effects of floods on the west branch of the Susquehanna River.

PORT JERVIS, MONTICELLO & NEW YORK.—Official confirmation is received that this company will lay seven miles of new track beyond Rose's Point, N. Y. (April 1, p. 246.)

QUEEN & CRESCENT.—Grading is reported to be in progress on an extension of the Belt Ry. of Chattanooga from East End, Tenn., south to Rossville, Ga. This Belt Line is leased to the Alabama Great Southern, which forms a part of the Q. & C. system. It is expected that the grading will be completed next week.

ST. LOUIS & SAN FRANCISCO.—This company has received 5,000 tons of 70-lb. rails, which are to be laid between Rogers and Fort Smith, Ark., replacing the 56-lb. rails. (Official.)

SIOUX CITY, CHICAGO & BALTIMORE.—The directors have decided to build this road from Sioux City, Ia., southeast 512 miles to St. Louis, Mo., this coming season. The officers are given under Elections and Appointments.

SOUTHERN PACIFIC.—Track-laying is begun, according to report, on the extension of the St. Martinsville Branch in Louisiana from St. Martinsville, northwest, about 24 miles, to Arnaudville. (Jan. 21, p. 51.)

SUMTER & WATEREE.—The Sumter County (S. C.) Board of Commissioners has given to this company permission to make use of the abandoned road-bed of the old Manchester & Augusta. The proposed road is from Sumter west 15½ miles to Middleton's, on the South Carolina & Georgia. James D. Blanding of Sumter is among the incorporators. (March 4, p. 170.)

TENNESSEE & CUMBERLAND RIVER.—Track-laying is reported to be practically completed on this line from Bear Spring, Tenn., south 14 miles to Tennessee Ridge on the Memphis Branch of the L. & N. J. H. Lory of Bear Spring is President. (Nov. 26, 1897, p. 841.)

TOLEDO & MONROE.—This company was incorporated in Michigan March 23, with a capital stock of $450,000, to build a line from Monroe south 22 miles to Toledo, O. The incorporators are Wm. C. Johnson, Lucius H. Collins, Peter N. Jacobson, Jr.; Elliott G. Stevenson, all of Detroit; Marvil I. Brabb and Henry S. Evans of Romeo, Mich., and Jacob N. Bick of Toledo, O.

TOLEDO & NORTHWESTERN.—The management has decided, according to report, to extend this new line from Albion, Mich., south to Homer on the M. C. and L. S. & M. S. Track is being laid on the section from Albion north 24 miles through Duck Lake, and Duttonville to Charlotte, a point on the C. & G. T. S. A. Williams, Albion, Mich., is General Traffic Manager. (Jan. 28, p. 71.)

VERA CRUZ & PACIFIC.—The amended notice of a concession to Alfred Bishop Mason of New York in the Railroad Gazette of April 1 is substantially correct, except that H. V. R. Read of London, who was the original concessionaire, has now no interest in it. The road is to be 400 km. (249 miles) long, extending from Vera Cruz through Tuxtepec and Paso San Juan to Santa Lucretia on the National Tehuantepec, with a branch from a point near Tuxtepec to Cordova on the Mexican Southern, or to Motzorongo, a point now connected by a little road about 25 miles in length. The line from Vera Cruz via Santa Lucretia to Salina Cruz, the Pacific port of the National Tehauntepec, will be 333 miles long. At Salina Cruz a first class port is being built by Pearson & Son of London, who have recently leased the National Tehauntepec from the Mexican Government. The preliminary lines of the new V. C. & P. have been run, and two engineering parties are making the location between Vera Cruz and Tuxtepec. The contract for the first 40 miles out from Vera Cruz will be let by June 1. Bids have already been received from a number of American contractors in Mexico. The work to be done is not particularly difficult. The maximum grade will not exceed 1 p. c., and the curves are easy. There will be about 2,000 ft. of steel bridges, two of 450 ft. and the rest from 100 to 150 ft. long. Bids have been invited in England and the United States for rails. These will necessarily be shipped by water, and the time of their shipment will depend upon the pending war. Alfred Bishop Mason is President, and W. W. Penney is Chief Engineer, both of Apartado 130, City of Mexico. The U. S. representative is Henry J. Bowdoin, Equitable Bldg., Baltimore, Md. (Official.)

VALDOSTA & ALBANY.—This company was incorporated in Georgia April 4, with a capital stock of $100,000, with privilege of increasing to $1,000,000, to build a line from Valdosta on the S. F. & W., northwest about 75 miles to Atlanta. The incorporators are Thomas Crawford, J. R. Dasher, T. F. Shaw, T. W. Shaw, E. W. Lane, J. F. Lewis, J. M. Briggs, C. R. Ashley, E. P. Rose, J. A. Dasher, Jr. It is stated that work is to begin at once.

WASHINGTON COUNTY.—Over 400 men are reported to be at work on this road, and about 800 tons of rails have been delivered. Grading is completed for about 15 miles, and the entire line is surveyed. The route is from Ellsworth, Me., on the M. C., east about 104 miles via Franklin, Steuben, Cherryfield, Harrington, Columbia, Jonesboro, Whitneyville, Machias, Marian, Edmunds, Dennysville, Pembroke, Charlotte and Barring to Calais, and from Pembroke through Perry to Eastport. G. M. Rusling of Machias, Me., is Chief Engineer. (Nov. 26, 1897, p. 841.)

WAYCROSS AIR LINE.—Surveys are made and contract let to J. H. Powers of Perry, Ga., for the extension of this line from Nicholls, Ga., west 12 miles, to Douglas. Some of the materials needed have been bought. (Official.)
J. S. Bailey & Co., McDonald's Mill, Ga., has recently bought the line. (April 1, p. 246.)

Electric Railroad Construction.

ATTLEBORO, MASS.—The Norton & Attleboro Electric St. Railway Co. has asked permission to issue $40,000 in 20-year 5 per cent. first mortgage gold bonds. President George H. Swazey represented the road before the Railroad Commissioners, and stated that the money was needed for equipment purposes. (Aug. 27, 1897, p. 611.)

CHATTANOOGA, TENN.—The Lookout Incline & Lula Lake Railway Co. is building an electric railroad to the top of Lookout Mountain from Point Park to Ross avenue, 2½ miles, and expects to have cars in operation by May 1. All the equipment has been bought and is partly on the ground. The company expects to build the road to Rock City and Lula in the near future. J. T. Crass, President.

CHICAGO, ILL.—The Town Board of Cicero at a meeting on April 9 granted an extension of time to the Cicero & Proviso Ry. in which to complete the Lake street branch of its system. (Feb. 25, March 11, pp. 149, 189.)
The Chicago City Ry. has begun to run its Indiana avenue electric cars downtown by trolley. Heretofore the trolley ended at Twenty-second street, where the Indiana avenue car was attached to the cable train for the run downtown. The Halsted street and Wentworth and Center avenues cars will soon run downtown by different routes, and will go around the surface loop bounding Madison street, Wabash avenue and Randolph street.

OLEY, PA.—Messrs. I. M. Bertolet, J. B. Herzog and J. B. Leinbach were appointed a committee to take steps toward securing an electric road to operate in Oley.

CUMBERLAND, MD.—We are informed that Dr. G. H. Carpenter, Liberty St., Cumberland, is interested in the projected electric road from Cumberland to Petersburg, Grant County, W. Va.
The Smith Cumberland Electric Railway Co., press reports state, was incorporated to build a road in Allegheny County. The incorporators are William T. Coulehan, Ferdinand Williams, Thomas L. Coulehan and Peter Lever.

DANIELSONVILLE, CONN.—Messrs. Sanderson & Porter, 31 Nassau St., New York, will build the electric road to Putnam that was to be built by the People's Tramway Co. Robert L. Warner, of Boston, is among those interested in the road.

DOVER, DEL.—The Delaware Electric Railway Co., it is stated, has closed the contract for building its road, and work will be begun shortly. The road, as planned, will be 38 miles long, and, beginning at Milford, will pass through Frederica, Magnolia, Rising Sun, Camden, Dover and Leipsic. The power house and carsheds will be located at Dover.

EASTON, PA.—The route of the proposed Easton, Palmer & Bethlehem Electric Railway is being laid out, and work on the road will be commenced in a few days. Charles A. Richardson and W. L. Kindill of Worcester, Mass., were elected president and treasurer, respectively, of the company. (Sept. 10, 1897, p. 641.)

MEADVILLE, PA.—The Meadville Traction Co. has completed its road, and cars are now in operation.

MECHANICSBURG, ILL.—The Mechanicsburg & Buffalo Railway Co. contemplates building an extension of several miles to the Mechanicsburg camp-meeting grounds.

NEWPORT NEWS, VA.—The Newport News, Hampton & Old Point Railway has applied to the Town Council of Hampton for a franchise to operate in the town.

PENSACOLA, FLA.—The Pensacola Electric & Terminal Co. is to build several miles of additional track. (Sept. 3, 1897, p. 627.)

PHILADELPHIA, PA.—The Point Breeze & Gibson's Point Railroad Co. of Philadelphia was incorporated to operate a road from Point Breeze to Gibson's Point, one and one-fourth miles; capital, $18,000. The directors are Malcolm Lloyd, M. W. Harkness, C. E. Bushnell, Edward P. Cooper, H. S. Muston, John W. Lieberton and William D. Cotton, Philadelphia.

PITTSFIELD, MASS.—The Pittsfield Electric St. Railway Co. has petitioned the Railroad Commissioners for authority to increase its capital stock $20,000 for the purpose of building an extension of two miles.

SCOTTDALE, PA. — The Council of Scottdale granted the Scottdale, Everson & Broadford Street Railway right of way through that town. Among those interested in this company are W. F. Sadler, Jr., W. N. Porter and J. R. Byrne.

SHENANDOAH, PA.—The Shenandoah Electric Railroad Co. has nearly completed the surveys for the road, and will shortly let contracts for equipment. (March 18, p. 209.)

STAMFORD, CONN.—The New York, New Haven & Hartford will commence operating its new Canaan branch by electricity within a few weeks.

SYRACUSE, N. Y.—An application has been made to the City Council by W. K. Niver, John Dunfee and others for a franchise to build an electric railroad from the western city line to South Clinton St. These gentlemen, it is supposed, are interested in the Skaneateles & Moravia Railroad.

UTICA, N. Y.—The Frankfort & Utica Railway Co. has let the contract for building its road, it is stated, to Beckwith & Quackenbush of Herkimer, and work will be commenced in a few days.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the dates named:

February 28:		1898.	1897.	Inc. or Dec.	
Burlington, Cedar Rapids & Northern.					
1 month	Gross	$308,361	$310,301	D.	$1,940
1 "	Net	109,736	131,690	D.	21,954
2 months	Gross	611,690	609,407	I.	2,283
2 "	Net	221,396	232,266	D.	10,870
Chicago, Indianapolis & Louisville.					
1 month	Gross	$215,465	$202,723	I.	$14,742
1 "	Net	39,045	47,074	D.	8,029
8 months	Gross	2,224,185	1,883,794	I.	340,391
8 "	Net	636,274	541,746	I.	94,528
Illinois Central.					
1 month	Gross	$2,183,398	$1,764,240	I.	$419,158
1 "	Net	691,188	572,827	I.	118,361
8 months	Gross	18,547,419	15,071,745	I.	3,475,674
8 "	Net	6,074,994	4,715,126	I.	1,359,968
Mexican National.*					
1 month	Gross	$485,452	$488,696	D.	$3,244
1 "	Net	219,563	241,679	D.	22,116
12 months	Gross	996,202	938,564	I.	57,638
12 "	Net	458,873	442,115	I.	16,758

*Mexican currency.

Minneapolis, St. Paul & Sault Ste. Marie.						
1 month	.....	Gross	$253,508	$228,443	I.	$25,065
1 "	.....	Net	96,320	80,058	I.	16,262
2 months	.....	Gross	516,590	417,272	I.	99,318
2 "	.....	Net	184,313	115,455	I.	68,858
Mobile & Ohio.						
1 month	.....	Gross	$351,126	$331,528	I.	$19,598
1 "	.....	Net	103,799	122,773	D.	18,974
8 months	.....	Gross	2,859,633	2,644,853	I.	214,780
8 "	.....	Net	1,046,012	1,002,120	I.	43,892
Oregon Short Line.						
1 month	.....	Gross	$429,477	$354,867	I.	$74,610
1 "	.....	Net	176,031	119,917	I.	56,114
8 months	.....	Gross	4,140,451	3,773,018	I.	367,433
8 "	.....	Net	1,659,059	1,298,229	I.	360,830
Rio Grande Western.						
1 month	.....	Gross	$208,724	$157,678	I.	$51,046
1 "	.....	Net	70,088	42,214	I.	27,874
8 months	.....	Gross	2,240,537	1,627,983	I.	612,554
8 "	.....	Net	835,741	535,905	I.	299,836
Union Pacific.						
1 month	.....	Gross	$1,178,280	$986,097	I.	$192,183
1 "	.....	Net	533,321	336,497	I.	196,824
2 months	.....	Gross	2,370,988	1,987,840	I.	383,148
2 "	.....	Net	980,647	653,627	I.	327,020
Union Pacific, Denver & Gulf.						
1 month	.....	Gross	$302,128	$235,385	I.	$66,743
1 "	.....	Net	121,469	73,726	I.	47,743
2 months	.....	Gross	625,418	483,632	I.	141,786
2 "	.....	Net	235,401	154,529	I.	80,871

March 31:		1898.	1897.	Inc. or Dec.
New York Central & Hudson River.				
1 month	..... Gross	$3,860,683	$3,692,022	I. $168,660
3 months	..... Gross	10,795,422	10,133,425	I. 661,997

ATCHISON, TOPEKA & SANTA FE.—Negotiations are being had between the Fort Worth & Denver City and the A., T. & S. F. for the acquisition of the Gulf, Colorado & Santa Fe of that portion of the line of the Ft. W. & D. C. from Panhandle City, Tex., southwest 15.1 miles to Washburn, and for trackage rights over the Ft. W. & D. C. from Washburn west 16 miles to Amarillo, where connection is to be made with the extension of the Pecos Valley.

BALD EAGLE VALLEY.—The Fidelity Insurance Trust & Safe Deposit Co. of Philadelphia, as mortgage trustee, will pay on May 2 principal at par and interest on four bonds of the B. E. V. line of the P. R. R.

BALTIMORE & OHIO.—The committees in charge of the various interests are reported to have come to an agreement as to the plan of reorganization. Announcement will not be made until the financial conditions of the country are less disturbed. (April 1, p. 247.)

CENTRAL VERMONT.—At a meeting of the security holders in New York, April 6, Richard Olney, T. Jefferson Coolidge, Jr., and B. P. Cheney, Chairman, of Boston; John A. Blair, James Stillman and Dr. W. Seward Webb of New York, were appointed a committee to carry out the reorganization of the company. An agreement has been effected between the C. V. and the G. T. companies whereby the G. T. agrees to pay holders of Consolidated R. R. of Vt. 5 p. c. bonds deposited with the committee for one year, beginning May 1, the interest due on the new first mortgage 4 p. c. and Series A bonds in advance of the issue of new securities. The committee agrees to hold the three defaulted interest coupons of 1897 and Jan. 1, 1898, on the 5 p. c. bonds in trust to secure the G. T. in case the reorganization plan that has been approved by the 85 p. c. of the bondholders shall not be carried out. (Feb. 25, p. 150.)

CENTRAL WASHINGTON.—The bondholders' committee has concluded an arrangement with the N. P. whereby the property will be turned over to that company under a lease. The details of the plan have not yet been announced. The C. W. was sold to the bondholders under foreclosure Jan. 19 at Spokane, Wash. It extends from Cheney, Wash., to Coulee City, 108 miles. It was leased on its completion in 1891 to the N. P., but went into the hands of a receiver in 1893, and the lease was cancelled two years later, the road being operated since by the receiver. (Jan. 28, p. 72.)

CUMBERLAND & OHIO.—The Louisville & Nashville has been ordered to pay $77,784 by the Law and Equity Court at Louisville, Ky., for interest on $250,000 of 7 p. c. bonds on the Northern Division of the C. & O., now known as the Shelbyville & Bloomfield, recently sold to the Southern. Interest on these bonds was guaranteed by the Lexington, Cincinnati & Louisville subsequently bought by the L. & N. The L. & N. repudiated this contract in 1883. (Feb. 4, p. 90.)

DES MOINES & KANSAS CITY.—This line, which has been owned for some years by the Keokuk & Western, but operated separately from that company, became a part of the K. & W. on April 1, and is operated by the officers of that company. It extends from Des Moines, Ia., to Cainsville, Mo., 112 miles.

DETROIT, TOLEDO & MILWAUKEE.—The operation of this road in conjunction with the D. & L. N. has been discontinued. The D. T. & M. was formerly the Michigan Division of the C. J. & M., and was reorganized in June, 1897, as an independent company and afterward sold to the D. & L. N., which took possession Aug. 1. The D. T. & M. extends from Allegan, Mich., southeast 156 miles to Toledo, O. (C. J. & M., Aug. 13, 1897, p. 580.)

INDIAN SPRINGS & FLOVILLA.—Commissioner A. W. Lane, of Macon, Ga., sold this road at Jackson, Ga., April 5, for $2,500, to G. B. Elder, W. F. Smith and R. V. Smith of Flovilla, and John R. L. Smith of Macon. There was about $12,000 in mortgages held against the company. The road runs from Flovilla on the Southern west 3 miles to Indian Springs. A receiver was appointed March 19, 1897. It is stated that improvements will be made at once.

MEXICAN NORTHERN.—The State Trust Co. of New York as trustee under the first mortgage gives notice that $23,525 has been set aside to buy these bonds at a price not to exceed 105 p. c. and accrued interest.

MEXICAN SOUTHEASTERN.—The injunction of E. L. Bartlett of Santa Fe, N. M., has been made permanent, forbidding the M. SE. from making any more obligations until the present outstanding debts are settled. (Feb. 11, p. 111.)

MISSOURI, KANSAS & TEXAS.—At a meeting at Parsons, Kas., April 7, of the stockholders of this company and the Kansas City & Pittsburgh for the purpose of consolidating the two lines, an injunction was served by the estate of R. S. Stevens, which holds 13,000 shares of the K. C. & P. stock, to prevent such consolidation. It is alleged that in 1870, when the M., K. & T. Co. was reorganized, there was no Kansas law authorizing consolidation, and the company has no right to do so without the consent of all the stockholders. Action was deferred until May 1. (March 4, p. 171.)

NORTHERN CENTRAL.—Series A '98 bonds for £200 sterling each; Series B 49 bonds for £200 sterling each, amounting altogether to £29,400 ($147,000), under the consolidated general mortgage have been drawn for payment at the London Joint Stock Bank, Ltd., London, or at the P. RR. office in Baltimore, Md., at the option of the holders, on July 1, when interest will cease.

PANAMA RAILROAD CO.—The annual report of the Panama Railroad Company for the year ending Dec. 31, 1897, was received last week. The company earned gross $2,300,705, an increase of $29,564 over the preceding year. The railroad proper earned of this $1,242,000, or a little more than $40,000 increase. The decrease was on the steamship lines. The total increase in railroad earnings, which amounted to 3.36 per cent., was from east bound freight, west bound treasure and mails. The passenger earnings actually fell off, as did the west bound tonnage. These decreases are ascribed to several causes, namely, the prejudicial effect of yellow fever epidemics throughout several of the republics, to revolutionary uprisings in Central America, to the general break-down of credit and business depression, and to depreciation of silver. A reduction in west bound rates was necessary also to meet the competition by the route around Cape Horn, more especially of the freight shipped from New York. The working expenses of railroad and steamship lines increased $170,000, and consequently, the net earnings, which amounted to $894,472, fell off $141,000. The largest item of increase in railroad expenses was in maintenance of way and structures, about $62,000, or more than 100 per cent. On the steamship line there was an increase in replacement of boilers and special repairs and also an increase under this heading of $41,000 charged to depreciation of steamers. These increases are apparently evidences of better conditions in operation and accounting. We are informed by the report that great improvements have been made in the permanent way, some of which improvements had been somewhat neglected in years past. The construction of the new port and pier at La Boca has progressed rapidly, and the estimated cost of construction covered by the original contract, namely, $962,000, has been entirely expended. The additional necessary expense will be about $427,000. It is believed this work will be finished before July of this year. While the net earnings represent nearly 6 per cent. on the capital stock, after payment of everything due, it has been thought prudent to declare no dividend because of the necessary work at the La Boca terminal.

PECOS VALLEY & NORTHEASTERN.—The securities to be issued by the new company, successor to the Pecos Valley, will be $2,790,000 first mortgage 50-year 5 p. c. bonds issued at the rate of $7,500 per mile; $3,162,000 6 p. c. non-cumulative preferred stock, and $3,162,000 common stock, both classes of stock being authorized at $8,500 per mile. The mortgage provides that an additional $1,500 per mile is to remain with the Trust Co. unsold, and can be issued only for betterments and equipments. The bonds are to cover 372 miles, including both the old road and the new line to Amarillo, N. M., and also the old and new equipment. The cash provided for under the plan will be deposited with the Trust Co. as a guaranty fund for two years' interest on the bonds, interest beginning July 1. Of the preferred stock, $2,815,200 will be issued to pay off old bondholders; the balance, $346,800, the common stock and the bonds will be used to complete the road and to provide equipment, besides paying off the indebtedness of the old company. The success of the reorganization is largely due to the A. T. & S. F., which has purchased an interest in the new securities, besides making a contract with the P. V. & NE. for an interchange of traffic and an agreement whereby the A. T. & S. F. has trackage rights over 140 miles, for a part of its line to Albuquerque. (April 1, p. 248; April 8, p. 266.)

PHILADELPHIA, READING & NEW ENGLAND.—At a meeting of the various committees held at Philadelphia April 11 the plan of reorganization proposed by the Fletcher Committee (March 18, p. 210) was accepted, and holders of securties are notified to deposit them with the Fidelity Insurance Trust & Safe Deposit Co. of Philadelphia.

SAN ANTONIO & GULF SHORE.—Carlos Bee has been appointed Receiver to disburse the balance of the purchase money under orders of the Court and also to represent the company in all litigation affecting these funds and in al suits in which Henry Terrell, former Receiver, is a party. This road was purchased under foreclosure sale July 7, 1896, by Oscar Bergstrom, Trustee, and the new company, the San Antonio & Gulf, now in possession of the property, was organized in April, 1897. (Jan. 14, p. 36.)

SOUTH JERSEY.—This company's property has been leased to the Atlantic City, controlled by the P. & R., the P. & R. taking possession at midnight, April 9. The S. J. extends from Winslow Junction, N. J., to Cape May, 54.1 miles, with a branch from Tuckahoe to Sea Island, 12.1 miles. It was sold to the Reorganization Committee at public auction March 29. (April 1, p. 248.)

UNION PACIFIC.—The U. S. Government has filed a petition for a deficiency judgment of $6,509,067 against the Union Pacific, growing out of the sale of the road. The matter has a hearing before Judge Sanford at St. Paul, Minn., April 16. (April 1, p. 248.)

Electric Railroad News.

BROOKLYN, N. Y.—A special meeting of the stockholders of the Kings County Traction Company was held at No. 40 Wall St., April 11, for the purpose of voting on a proposition to dissolve the company. At the close of the meeting it was declared that 36,181 votes had been cast in favor of the proposition. The total number of shares outstanding is 45,000. The plan was to consolidate the Kings County with the Nassau Electric Railroad, but it is believed that the dissenting stockholders will strongly oppose the plans for dissolution and consolidation. (March 25, p. 226.)

LANCASTER, PA.—It is stated that Mr. Wm. B. Given, receiver of the Pennsylvania Traction Co., has completed a plan of reorganization, and is being supported in the matter by the Provident Life & Trust Co. of Philadelphia.

TRAFFIC.

Traffic Notes.

The Nashville, Chattanooga & St. Louis now sells excess baggage books containing coupons worth $25 for $20.

It is reported that the boatmen on the Erie Canal have failed to form an agreement to maintain rates the coming season.

Fifteen hundred barrels of apples were recently carried from Kansas City to Liverpool under continuous refrigeration all the way.

The United States Supreme Court has denied the right of appeal from the decision of the United States Circuit Court of Appeals setting aside the injunction obtained by the Lone Star Line against the railroads. As heretofore noted, the steamers of the line have been withdrawn.

The railroads of Texas have issued schedules of storage and demurrage charges on freight, in accordance with the recent order of the Interstate Commerce Commission. According to the Houston "Post," consignees will be notified of the arrival of freight, and storage charges will begin to accrue three days after such notice is given. For the first 10 days charged for, the rate will be 5 cents per 100 lbs., and the rate will vary according to the length of time, the price for 50 days being 15 cents per 100 lbs. The minimum charge will be 10 cents. Bulk freight will be $1 per car per day, as heretofore. On ordinary bulk the free time will be 48 hours; on coal it will be 72 hours, and on grain delivered to the elevators it will be 48 hours.

Chicago Traffic Matters.

Chicago, April 13, 1898.

The meat rate war is to continue, notwithstanding the agreement made to restore packing house and dressed beef rates from the Missouri River to Chicago. One of the strong lines has refused to agree to the compact, and all efforts to bring it into the fold have so far proved unsuccessful.

Representatives of the Eastern lines in this city have recommended to the managers a reduction in grain rates to meet lake competition. They ask that a rate of 15 cents be fixed for all grain and grain products. It will be seen from the table below that railroad shipments have already been diminished one-half by the opening of lake navigation. It is said that corn is being taken from here to New York by lake and rail at 4 cents a bushel. The rate by rail from Buffalo to New York is 3 cents, and the lake rate to Buffalo is down to 1 cent. The fact that rail shipments kept up so long is a striking evidence of the very large quantity of grain to be moved as well as an indication that the rail rates must have been very low.

The Chicago & Alton has given notice that in order to protect its business through Kansas City it will, as an offset to the special arrangements made for the Omaha exposition, grant a five days' stop-over on all tourist tickets through Kansas City, and that during the six months of the exposition it will apply to Kansas City the $20 rate for the round trip made by the Western lines from Chicago to Omaha. Other lines will grant the five days' stop-over in Kansas City.

The Illinois Railroad Commissioners are still considering terminal charges at the stock yards. The stock raisers of the State persist in their claim that these charges are excessive, and want the Commissioners to order them reduced. On the other hand, a committee of railroad employees at the yards has appeared before the Commissioners and requested that the present rates be maintained, so as to prevent the reduction of employees' salaries.

Western lines have agreed to advance passenger rates for Klondike business April 20 between Missouri River points and the North Pacific coast. Very little of this business has moved through these gateways, and an advance of $10 will be made.

The Great Western Despatch is the name of a new fast freight line to be operated over the Grand Trunk and West Shore roads to supplant the Hoosac Tunnel line which was discontinued on account of the recent lease by the Grand Trunk of trackage rights to the Wabash, over its Buffalo line.

The St. Paul road has agreed to the proposition of the Pullman and Wagner sleeping car companies, to make an advance of 40 per cent. on rates for berths in compartment sleeping cars.

The Central Passenger lines have agreed not to grant reduced rates for large conventions, unless the cities where they are to be held first take action through their city governments to prevent the brokers from handling the return portions of such tickets.

Eastbound shipments, exclusive of live stock, from Chicago and Chicago junctions to points at and beyond the Western termini of the trunk lines for the week ending April 7 amounted to 97,897 tons, as compared with 194,064 tons the preceding week. The following is the statement in detail for the two weeks:

Roads.	Week Ending April 7. Tons.	P. C.	Week Ending March 31. Tons.	P. C.
Baltimore & Ohio	11,267	11.5	16,722	8.6
C., C., C. & St. L.	3,640	3.7	11,912	6.1
Erie	11,686	11.9	20,863	10.7
Grand Trunk	4,866	5.0	17,388	9.0
L. S. & M. S.	23,813	24.3	34,080	17.6
Michigan Central	13,071	13.4	31,954	16.5
N. Y. C. & St. L.	10,543	10.8	20,355	10.5
P., C., C. & St. L.	5,350	5.5	6,217	3.2
P., Ft. W. & C.	11,293	11.5	22,647	11.2
Wabash	2,368	2.4	11,923	6.1
Totals	97,897	100.0	194,064	100.0

Lake shipments last week amounted to 197,590 tons.